AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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DECEMBER, 1923

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Dalton, and Atlanta, Ga.

More Nordray Broad Looms Hyatt Equipped

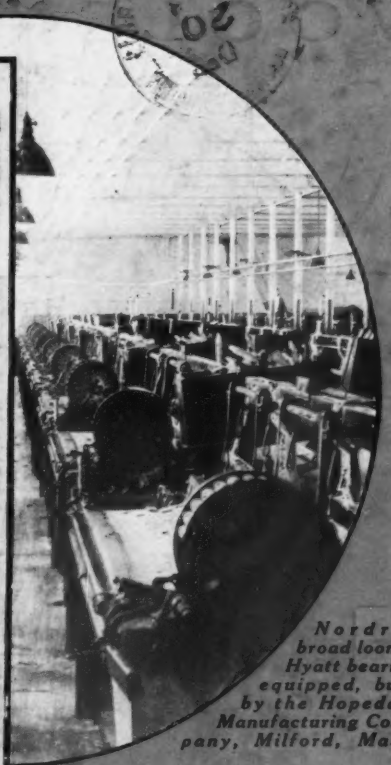
One hundred and one new Nordray broad looms built by the Hopedale Manufacturing Company, Milford, Mass., and equipped with Hyatt roller bearings are now in operation at one of the prominent North Carolina mills.

By specifying that these new looms be Hyatt equipped this mill has insured dependable and economical weaving for years with no necessity of bearing adjustments or replacements.

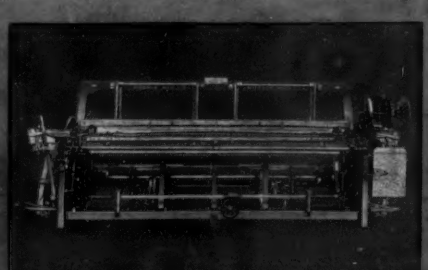
In recent tests Hyatt equipped narrow looms have shown a power saving of 23.4% and it is only logical to expect a greater horse-power saving on these broad looms.

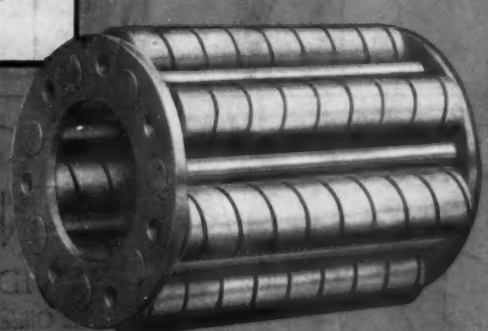
The new looms in this southern mill are similar to the Hyatt bearing Nordray broad looms recently installed by the Pepperell Manufacturing Company of Biddeford, Me. These mills can look forward to worthwhile savings in power, in lubrication and in maintenance costs.

Secure these weaving economies for your mills—specify that your looms be Hyatt equipped.



Nordray broad looms, Hyatt bearing equipped, built by the Hopedale Manufacturing Company, Milford, Mass.





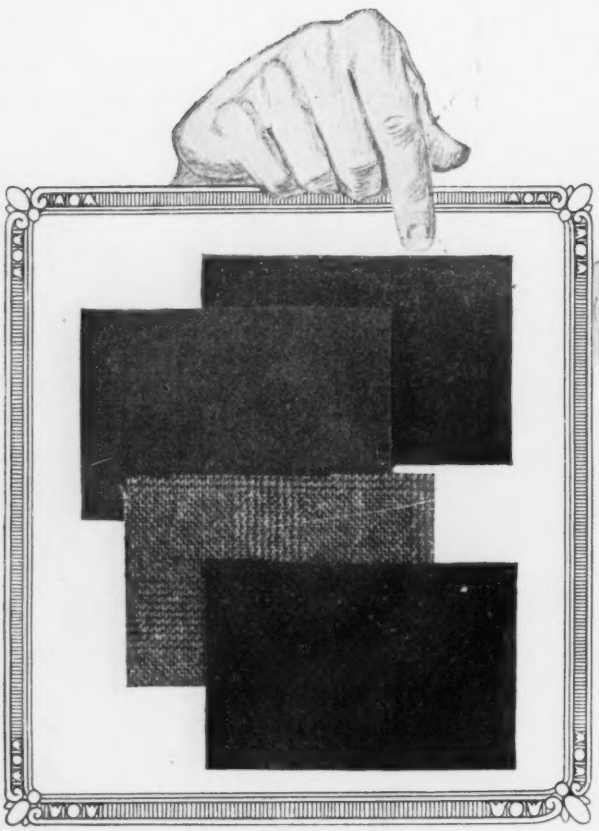
HYATT ROLLER BEARING COMPANY

Newark Detroit Chicago San Francisco
Worcester Milwaukee Huntington Minneapolis Philadelphia
Cleveland Pittsburgh Buffalo Indianapolis

FRANKLIN DYEING!

It can be made a big Quality and Economy factor in your production of

WORSTEDS
and
WOOLENS



SEND your worsted yarn, either single or ply, to us on bobbins, tubes or cones. We will dye it on Universal wound parallel tubes and return it on these tubes or on cones. We also receive worsted yarn on jackspools, dye it on our special perforated dyeing spools and return it to you on the original jackspools.

We eliminate for you the bother of handling skeins and warps, and the yarn waste which goes with them.

As to quality, Franklin Dyeing is fast becoming the standard in the trade. Franklin colors are distinctive and brilliant.

We can also dye fine single worsted yarns that *can not be dyed by any other process.*

Write today, stating your dyeing problem and we will be glad to make recommendations and quote prices.

FRANKLIN PROCESS Co

Philadelphia PROVIDENCE Manchester, Eng.

New York Office, 72 Leonard Street

SOUTHERN FRANKLIN PROCESS CO.
Greenville, S. C.

An Improved Tool for Spinners and Weavers

Because Filling Bobbins are made of wood they are subject to changes in the Spindle hole from Heat, Water, Steam and Humidity, all of which have a part to play in the process of Spinning, Yarn Conditioning and Weaving. These changes in the Filling Bobbins have disastrous effects where automatic looms are used because they decrease the product of the Spinning Frames and introduce Weaving troubles that decrease production and increase seconds.

Modern Conditions Demand Brass-Bushed Filling Bobbins

Whose butts do not change because the wood is held firmly between the inside bushing and the rings on the outside. They eliminate these Spinning and Weaving troubles and thereby increase a mill's product and profits. You cannot afford to continue to handicap your Spinners and Weavers with an inferior and defective tool.

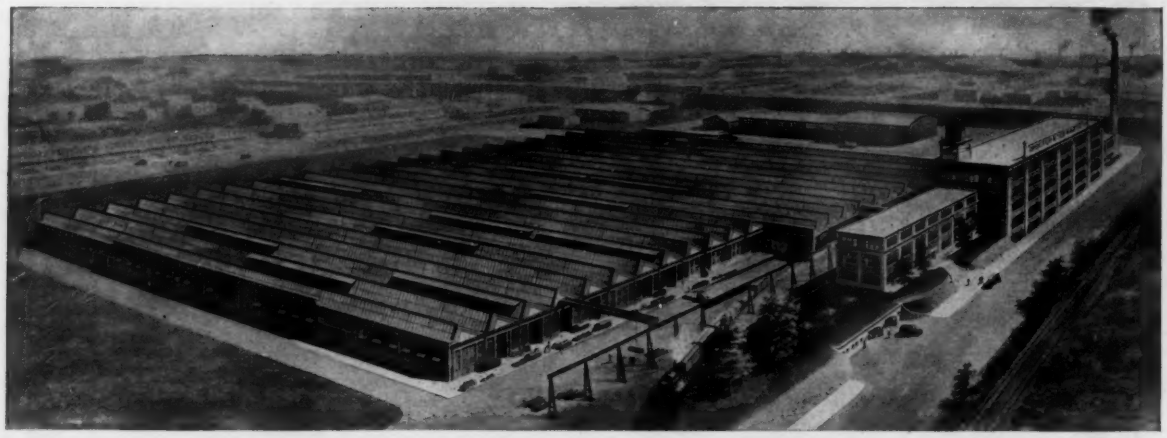
Let's Talk It Over. Our Salesmen and Experts will be glad to explain in detail.

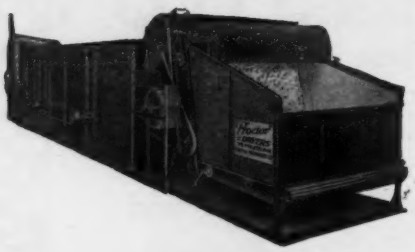
DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

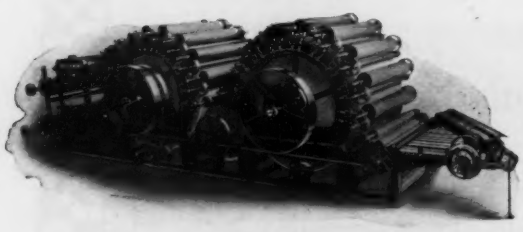
Southern Office Atlanta Georgia

Copyright 1917 by Draper Corporation

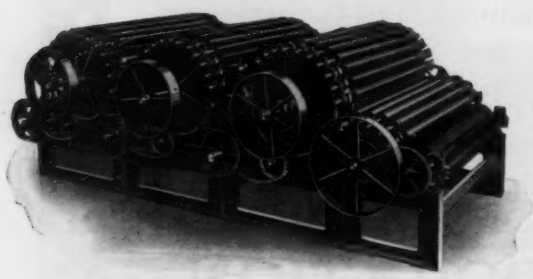




DRYERS



CARDS



GARNETTS

A Busy Five Acres

Where the hum of thriving production over 223,000 square feet of efficient modern machinery and work space, supplies the best evidence of the world-demand for its products —

"Proctor"

DRYING MACHINERY
for all Textile Materials

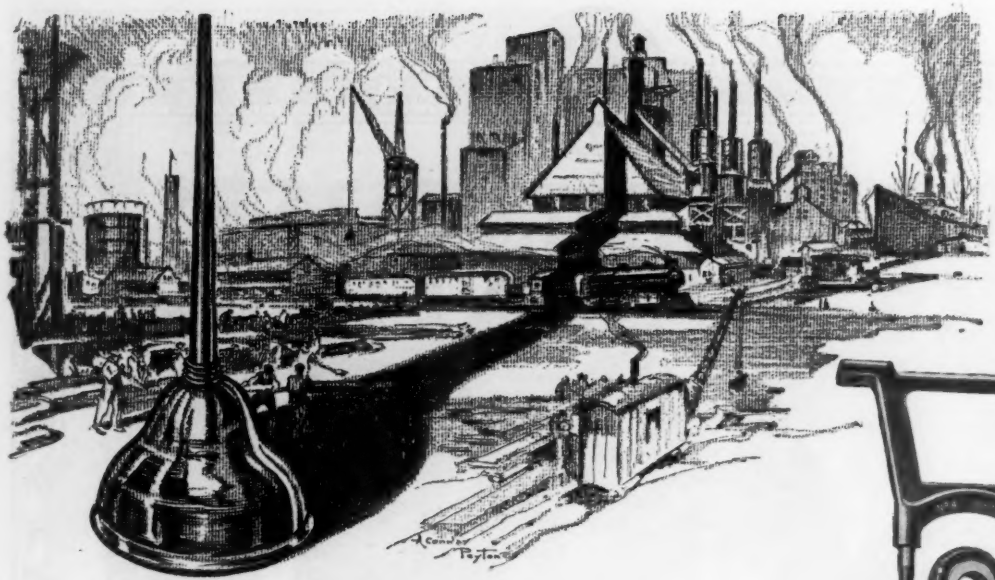
"Smith-Furbush"

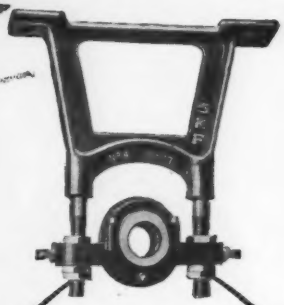
CARDING, GARNETT,
PREPARATORY, FELTING
& WASTE MACHINERY

From a very small start in 1812, the business of Proctor & Schwartz, Inc., has grown to require this great plant, on the firm foundation of producing every machine the best for its specific purpose.

PROCTOR & SCHWARTZ, INC.

Formerly
THE PHILADELPHIA TEXTILE MACHINERY CO.
SMITH & FURBUSH MACHINE COMPANY
PHILADELPHIA, PA.





Is the shadow of the oil can on your plant?

ARE you dependent upon the oil can and the handy man to keep your plant going—to prevent hot bearings and other troubles which curtail production and eat into your profits?

Remove the shadow of the oil can from your plant by installing Skayef self-aligning ball-bearing hangers which will not bind and heat. Lubricant and maintenance charges will be reduced 60 to 80 per cent and you can release the handy man for more profitable work. A little lubricant once every three or four months is all the attention this type of hanger requires.

Others have found that ball-bearing equipment pays for itself in two years and often in a shorter period. Let an **SKF** engineer estimate what you will save.

For Nearest Distributor See MacRae's Blue Book

1066

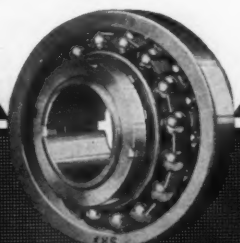
SKAYEF
—the 4-Saving Hanger

1st Saving Skayef Hangers save from 50 per cent upward of the energy which plain bearings consume in friction. This means a saving of 15 to 35 per cent of your power cost.

2nd Saving Considerable time is saved by eliminating shutdowns for replacing or adjusting bearings; forced idleness of machines and men is a cost-factor too big to be ignored.

3rd Saving Lubricant consumption reduced 60 to 80 per cent as compared with plain bearing hangers. Lubricant required only at infrequent intervals and it cannot leak out and ruin belts or product.

4th Saving There is no discernible wear of the hard steel balls and races and absolutely no shaft wear. Dust and grit cannot enter the bearings and Skayef self aligning ball-bearings have the exclusive inherent ability of compensating automatically for shaft deflections.

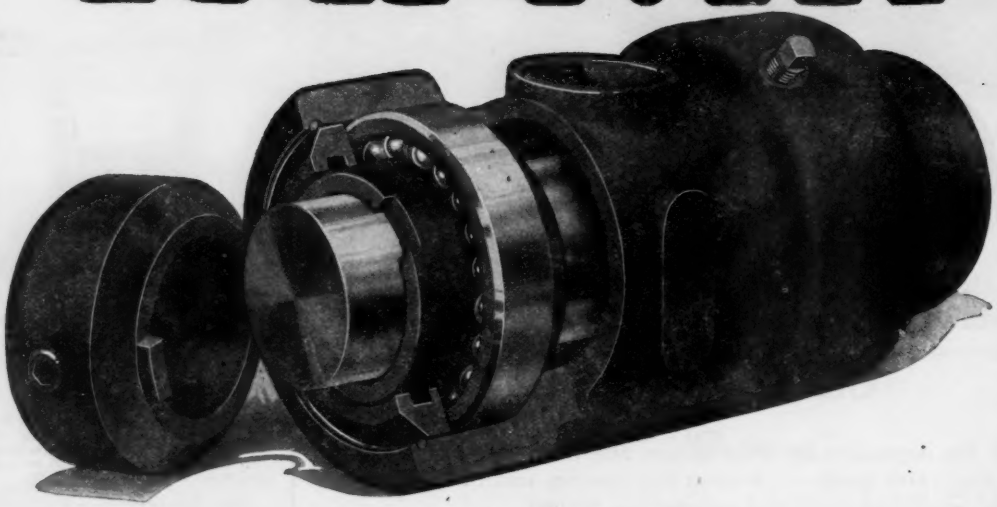


SKAYEF
Self-Aligning Ball-Bearing HANGERS

Made Under **SKF** *Supervision*

THE SKAYEF BALL BEARING COMPANY - - - - 165 Broadway, New York City

FAFNIR



Fafnir Double Ball Bearing Hanger Box, illustrating the construction.

Six Cardinal Features of Fafnir Double Ball Bearing Hanger Boxes:

1. **Two alloy steel ball bearings,** affording the shaft double support.

2. **Unit construction,** involving no delicate adjustments or assembly on the shaft.

3. **Box aligns as a unit** without affecting the ball bearings.

4. **Positive drive,** by means of the Fafnir Wide Inner Ring and Driving Collar.

5. **All loads carried by the balls.**

6. **Fafnir Boxes fit all standard hangers.**

All standard types and sizes.

THE FAFNIR BEARING COMPANY

New Britain, Conn.

Southern Representatives

O. R. S. Pool,
Box 1375,
Greenville, S. C.

W. Shaw,
358 So. Converse St.
Spartanburg, S. C.

The gift that builds most good-will.

This Christmas Give Them *Insurance*

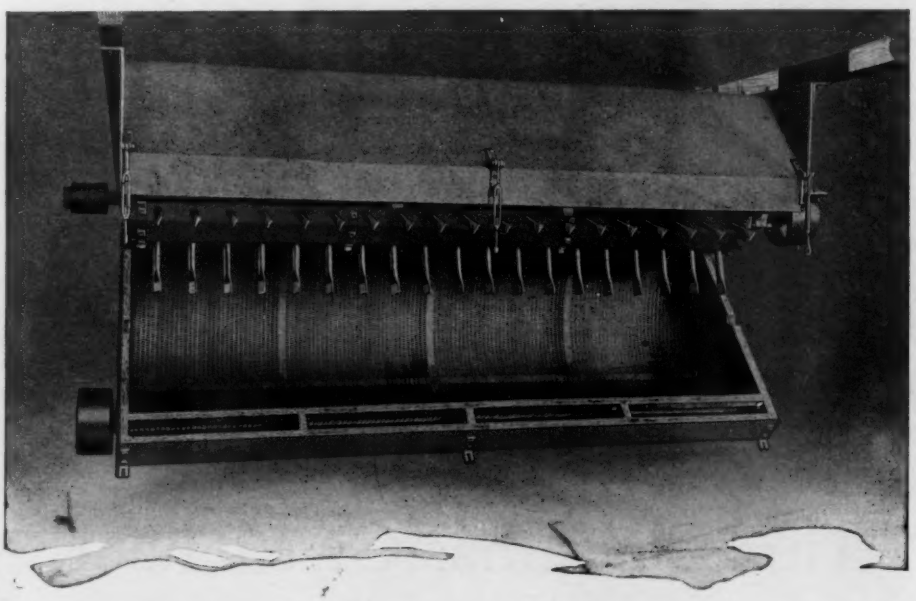
WITH no greater cost than that of the Christmas basket or the traditional turkey, you can give employees a lasting gift—Life Insurance. It will mean much more to your men—and to you in increased team-work than any passing remembrance. 73.8% of the 2,000 employees of the Public Service Company of Northern Illinois chose it above all other company gifts. It's a unique gift—one that cannot be duplicated. And its effects will not be gone in a week—or a year. Many concerns rate group insurance as more than a gift—as a profit-paying investment. Why not turn this Christmas into one of double good-will and profit both to you and your employees?

A plan all ready for you

Christmas is nearly here. But, The Travelers, which has planned Christmas Group Insurance for hundreds of industrial and business leaders, hasa plan all worked out to fit every business. It includes high grade Christmas cards to mail to your employees announcing the insurance plan, or cards to insert in the Christmas Pay Envelope. The details are ready for you. No obligation —write or wire at once.

The Travelers

Insurance Company
HARTFORD, CONNECTICUT



Put Your Conveyor Pipe to Work

You can give your cotton a thorough cleaning, opening and aerating, while it's being conveyed from the bale breakers to the picker room. The Murray Cotton Cleaning and Aerating Machine forms a part of the conveyor pipe, and vastly improves the stock before it is fed to the pickers.

The "Murray" takes up very little extra space since it can be hung from the ceiling. Its supply of cotton is drawn through it by the suction of the conveyor pipe fan, no additional fan or increased draft being necessary. A further economical feature is the fact that the "Murray" requires practically no attention since the dirt is automatically disposed of through a chute at one end.

Handles 2,500 Lbs. Hourly.

2,500 pounds of cotton per hour can be cleaned, opened and aerated in the Murray machine at a power expenditure of only 3 to 5 H.P. The stock is given a thorough treatment by 114 revolving arms.

The Bowling Green Spinning Mills write us stating "The Opener we purchased from you is giving entire satisfaction in every way. In fact we think it is a wonderful machine."

THE MURRAY COMPANY, ATLANTA, GA.

Northern and New England Sales Representatives:
Aldrich Machine Works
P. O. Box 132, Providence, R. I

Carolina Sales Representatives:
Carolina Specialty Co.
Brevard Court
Charlotte, N. C.

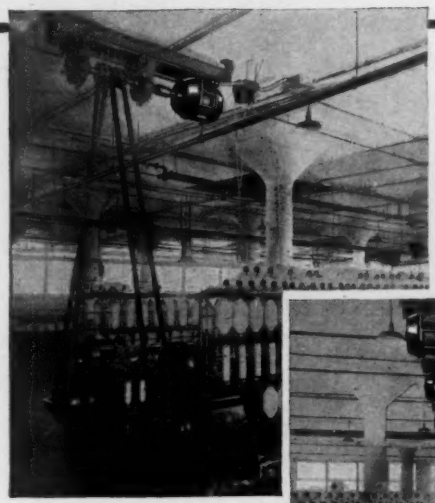
The Murray (PAT. PENDING)

COTTON CLEANING AND AERATING MACHINE

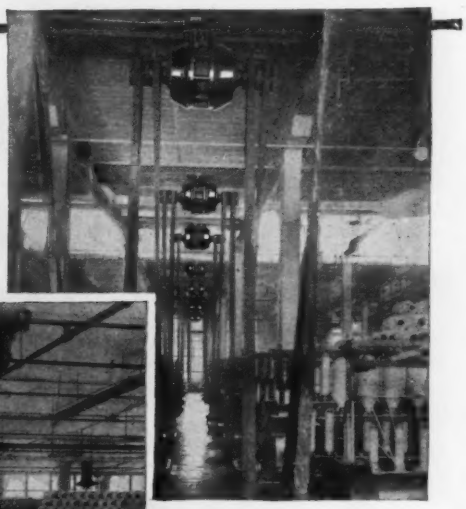
COTTON WELL OPENED IS HALF SPUN

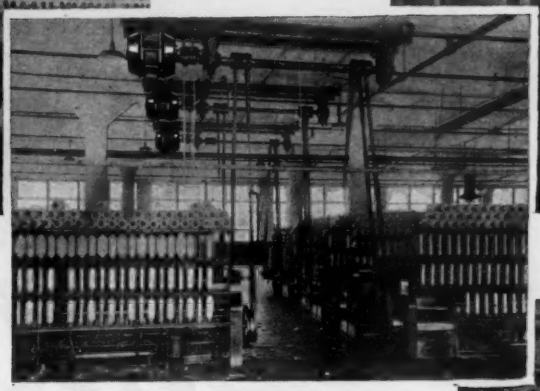
Cotton

The Clean and Efficient Drive



Carding and Roving





Best Results with G-E Motors

The use of G-E Motors provides a clean, successful way of driving Card Room machines.

All the machinery in the Card Room can utilize the light group drive method to advantage, but the tendency is more and more toward the individual drive where feasible, and where its advantages are apparent.

For individual drive, totally enclosed G-E Motors of the loom motor type, controlled by enclosed hand-operated switches giving time element thermal fuse protection, are recommended.

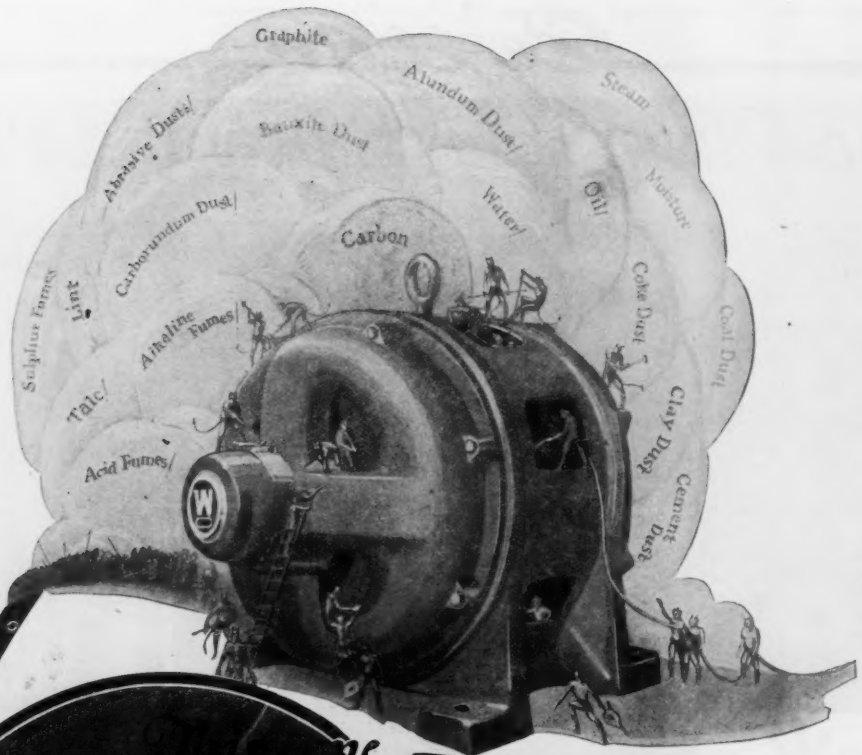
Slubbers, speeders and fine frames are usually driven in small groups, and good results are obtained by using either 2-frame or 4-frame drives, with G-E Motors of from 5-h.p. to 15-h.p. capacity.

G-E engineers will gladly co-operate with you in securing the most efficient motor drive for your machines.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL ELECTRIC

44-48



Lint—

An ineffective war is daily being waged against Westinghouse motors everywhere by destructive agents.

The necessary protective qualities have been determined by a careful study of each application. Westinghouse motors go into battle with the assurance of victory.

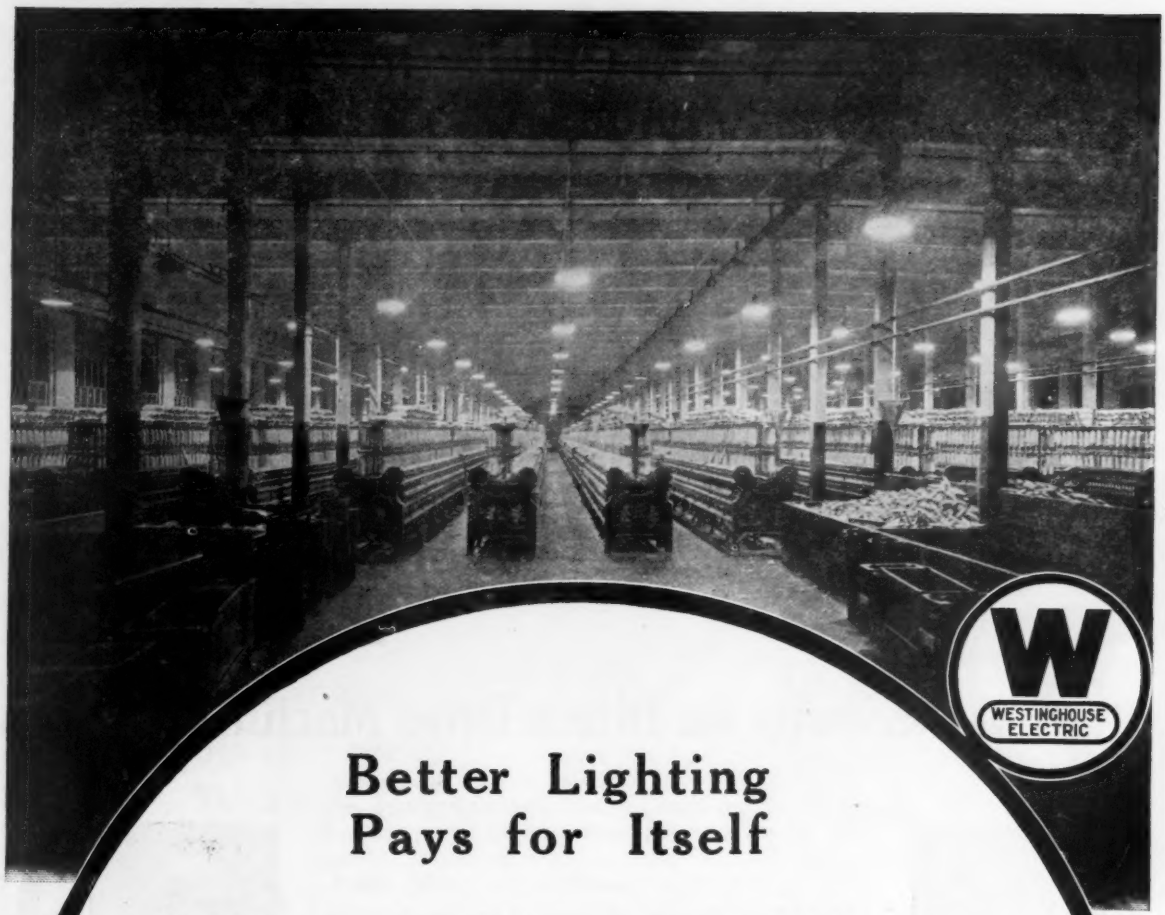
Dust proof bearings, impregnated windings, screens for the protection of the interior against lint or other foreign substances, are among the protective features of Westinghouse Textile Motors.

Successful performance has been a source of satisfaction to both builder and user alike—testifying to the fact that they are designed right, built right and applied right.

Westinghouse Individual Motor Drive has become standard practice in every branch of the textile industry.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Westinghouse



Better Lighting Pays for Itself

Good lighting not only saves maintenance money, but it also helps you obtain higher earnings from your investment because it produces definite and measurable increase in production. The average results, computed from records made in hundreds of plants where the lighting conditions have been improved, show production increases of 12 per cent. In addition, spoilage was decreased 25 per cent and accidents decreased 25 per cent.

The investment required to produce these and many other benefits is so slight that in practically all cases it is the lowest part of the overhead charge. The manufacturer who tries to cut the cost of this lowest item, saves but a few dollars at the most; and he does so at the expense of the two largest cost items on the list—labor and material.

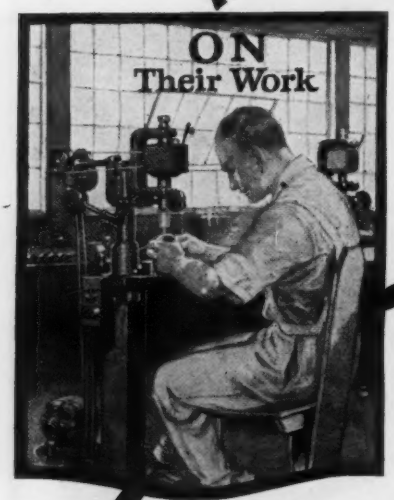
Westinghouse Electric & Manufacturing Company
George Cutter Works South Bend, Indiana

Sales Offices in All Principal Cities of the United States and Foreign Countries

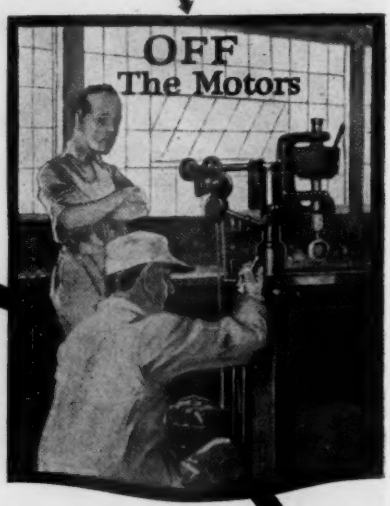
Westinghouse

For Speed and Economy of Operation

Keep Their Minds



W
WESTINGHOUSE ELECTRIC



A Necessity for Direct-Drive Machinery

WK-10
For motors up to 2 H. P.

Snap! A turn of the button on the WK Motor Starter and production *goes ahead*. These up-to-date, compact, convenient safety motor starters fully protect the motors. No more delays; no more burning out of small motors; no more motor trouble for the "trouble man".

WK Motor Starters are designed specifically to protect small motors. They can be mounted where your mechanics can get at them. They are simple and easy to install and operate. They are small and do not obstruct light. They are fully equipped with up-to-date and positive quick-make and quick-break features.

They fill a long felt need. They have been designed not only for the purpose of protecting the motor but also to give a full measure of protection to the operator; and electricians in hundreds of plants can tell you how well these starters have helped them keep their plants running to the maximum efficiency.

One of the secrets of their unique effectiveness is the time element feature which takes care of harmful overloads in an absolute, positive way. You will be amazed to find how economically you can equip your plant with the WK-10 and WK-20 Motor Starters.

WK-20
For motors from 2 to 5 H. P.

Westinghouse Electric & Manufacturing Company
Mansfield Works **Mansfield, Ohio**

Westinghouse

Barber-Colman System

of

SPOOLING

and

WARPING

Automatic Spooler with Weavers Knotter

High Speed Warper

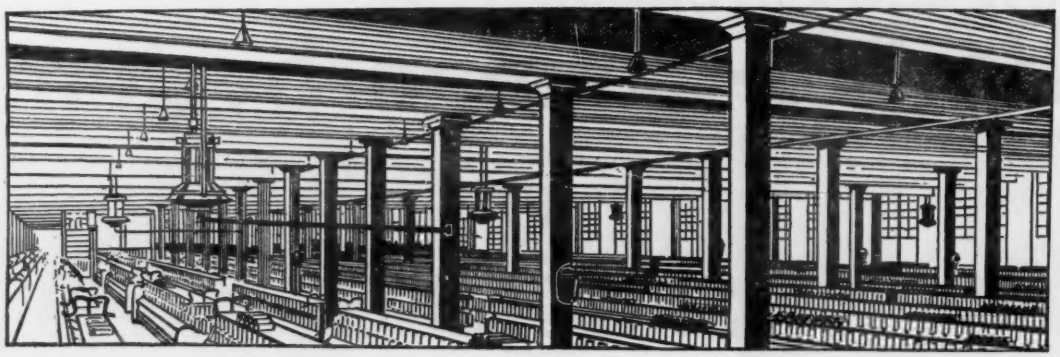
Costs only half as much to operate as the ordinary spooling and warping process.

Occupies less than half the floor space. Saves the strength in the yarn and improves the weaving.

BARBER-COLMAN COMPANY

Rockford, Ill.

Boston, Mass. **Greenville, S. C.**



Buying "Humidifiers Plus"

Our particular aim is not to sell Humidifiers but HUMIDIFICATION — *There's a big difference*

It's been a comparatively easy matter to sell humidifiers. Mysterious looking contrivances could be stuck up in a more or less haphazard way at different points in the room. That conditions were improved in some cases was due, not to any inherent efficiency in the systems themselves, but to the desperate need for moisture in the atmosphere in the rooms where they were placed.

Every Parks-Cramer installation is scientific. The guesswork of old humidifier practice has given way to KNOWLEDGE. It is now possible to get exactly the humidification required, regardless of the time of day—or year, the location of the mill, the peculiarities of construction or what not.

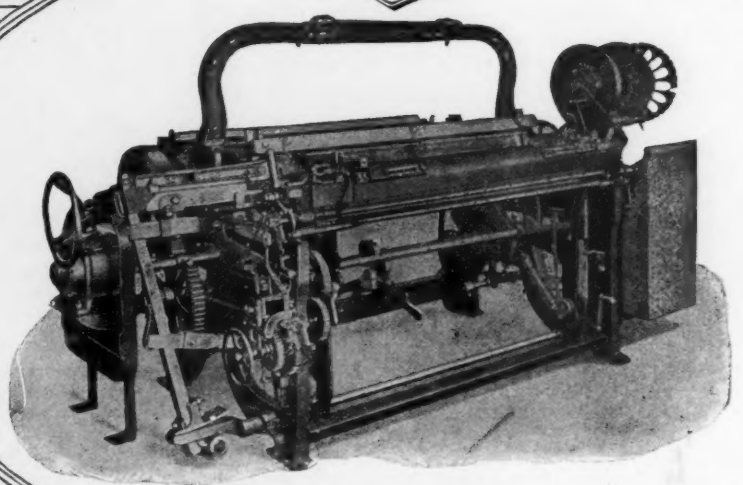
Many a mill man who has replaced his old "rule-o'-thumb" system with a Parks-Cramer system has been astounded at the results.

Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte



Stafford bobbin-changing plain goods loom.

Stafford Looms Increase Production

We manufacture a complete line of automatic looms, both shuttle and bobbin-changing for weaving practically every type of fabric that can be made with a single shuttle. ¶ Stafford shuttle-changing looms will handle cop filling just as successfully as bobbin filling. We have a loom for every kind of yarn, coarse or fine, and for practically every variety of fabric, plain or fancy.

THE STAFFORD COMPANY
WEAVING MACHINERY
READVILLE, MASS.

Branch Office
502 Colt Building
Paterson, N. J.

Southern Agent
Fred H. White,
Charlotte, N. C.

Canadian Representative
Whitehead, Emmans, Limited
Montreal

AUTOMATIC
STAFFORD
LOOMS

WILLIS A. SUTTON, SUPERINTENDENT · H. REID HUNTER, ASSISTANT SUPERINTENDENT · MARY W. POSTELL, ASSISTANT SUPERINTENDENT · R. L. McCULLOUGH, BUSINESS MANAGER

OFFICE OF
BOARD OF EDUCATION
AND
SUPERINTENDENT ATLANTA PUBLIC SCHOOLS
ATLANTA, GA.

Southern Theatre Equipment Co., Atlanta, Ga.
Gentlemen:--Regarding the educational value of the motion picture in public schools, I wish to call your attention to the following points:

1, 2 and 3--(See previous ads.)

4--MOTION PICTURES ATTRACT AND HOLD INTEREST MORE EASILY. The mind is relieved of the task of interpretation put upon it by any method depending upon words. It gives the nearest approach to actual experience, and experience still retains her well known reputation as a teacher.

A letter from a man who knows

You may use any or all of this letter as you desire.
Very truly yours,

Joe W. Coffman
Supervisor, Visual Instruction,
Atlanta Public Schools.

VISUAL EDUCATION with the motion picture has already proven its value in city schools, and it will prove of even greater value in village and community schools because it accomplishes even greater results with less time and less experienced teachers.

Through the courtesy of Mr. Coffman, we are presenting each month in paragraph form, parts of a very enlightening letter which he has written us, and through Mr. Coffman also, we are able to give our textile mill friends valuable help and suggestions regarding the use of this system in community school work, the selection of the proper films, in fact the solution of every problem which may present itself.

Our service to textile mills is the result of years of experience, and we have installed Powers Motion Picture Projectors and theatre auditorium equipment in over 60 Southern mills. Whether it be a visual education system or complete motion picture theatre equipment, including screens, chairs, cooling systems, etc., we are ready to take the problem off your hands and turn the system back to you ready for operation.

May we present our special proposition to you?

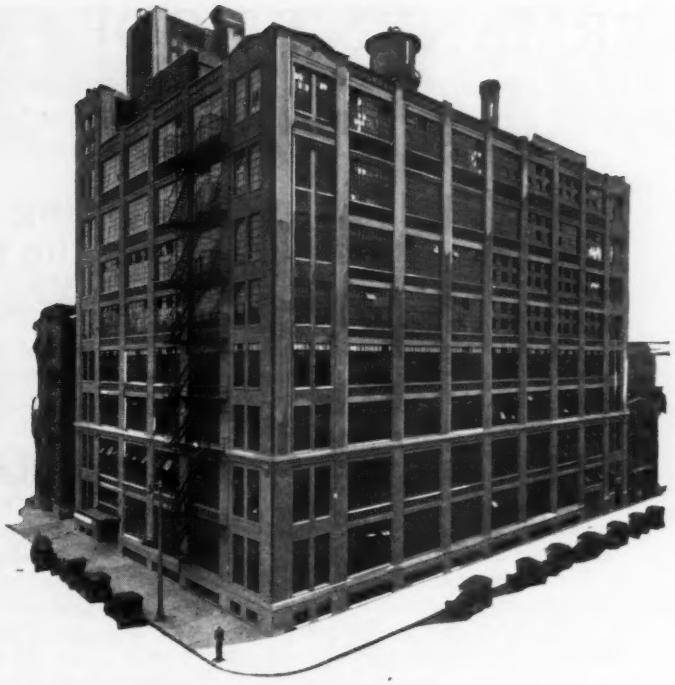
Southern Theatre Equipment Company

WILLIAM OLDKNOW, President.

100 WALTON STREET
ATLANTA, GEORGIA

THREE TWENTY-EIGHT CALIFORNIA ST.
OKLAHOMA CITY, OKLA.

1907 COMMERCE ST.
DALLAS, TEXAS



A Model of Manufacturing Efficiency

THIS is the new dye-house and finishing building of the Phoenix Hosiery Company at Milwaukee, *one of the largest single units in the country devoted entirely to hosiery finishing.* The building is a model of manufacturing efficiency.

Location of the dye-house at the top of the building assures a maximum of natural light and ample ventilation, and keeps the vapor and fumes from other parts of the building. Stock is raised at one lift from the undyed stockroom in the basement to the dye-house on the 7th and 8th floors, and then is carried by gravity to the other operations on the floors below.

Boarding, mating and boxing rooms are located on the 4th, 5th and 6th floors, so arranged as to provide a minimum amount of handling of boarded goods.

Meeting difficulties, and in many cases turning them to advantage, is one part of the service of Lockwood, Greene & Co. In overcoming the obstacles encountered in designing the Phoenix Hosiery building, Lockwood, Greene & Co. were aided by years of experience as textile mill engineers and managers. More detailed information about this building and others of equal interest will be provided on request. A Lockwood-Greene representative will be glad to call and discuss your own building problems.

BUILDING WITH FORESIGHT

LOCKWOOD, GREENE & CO.
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PERMANENT ROOF CONSTRUCTION

A series of articles by the Technical Staff of the Richardson Research Laboratories, showing what modern science has done to perfect the materials and methods of roof construction

No. 3. How waterproofing bitumen is made *permanent* at the refinery

How can you be sure *beforehand* that the waterproofing bitumen you put on your roof will endure? Most asphalts look alike on the surface, but which ones will resist year after year of heat, rain, snow, and gruelling strain to which all buildings are subject?

Of course there are several physical tests which waterproofing bitumens must undergo to prove their fitness. Yet inferior bitumens can be doctored sufficiently to "get by", just as poor mixtures of concrete may pass the inspector yet break down later under strain.

But the years of service your waterproofing will give, although indicated by certain physical tests, is really determined by the proper balance of its chemical parts at the refinery. Such equilibrium is one of nature's vital laws, applying to all phases of life. You, for example, would die in a moment if the chemical constituents of your blood were not correctly balanced.

Working with these important facts in mind, the Richardson Research Laboratories have produced a waterproofing bitumen which not only passes the required physical tests, but is also *chemically balanced*, and thus is immune from future deterioration. The name of this unique product is Viskalt.

Permanence built from within

The first step in getting this proper chemical balance in Viskalt is to secure the best raw material.

Many waterproofing bitumens are derived from crude petroleums which contain only small quantities of actual asphaltum. In an effort to obtain from these petroleums every drop of gasoline, lubricating oils, etc., many processes of refining are so destructive that they leave in the asphaltic residuum high percentages of harmful constituents —asphaltic acids and anhydrides—which later destroy its waterproofing value.

Thus, although a bitumen of this kind may be doctored to pass the physical tests, it is sure to break down later under weather attacks.

Viskalt, on the other hand, is derived from an asphaltic base petroleum found only in certain parts of Mexico and containing more than 80% asphaltum. Thus, since asphaltum is the *main* product, special care is taken in refining to keep it free from harmful constituents. Viskalt therefore, is able not only to pass the physical tests but also to hold together *permanently* in spite of severe weather attacks.

Ordinary waterproofing bitumen, moreover, is often injured through unscientific methods of refining. Overheating or burning, for example, produces *carbenes*, aptly termed the tubercular germ of waterproofing. Although the physical tests may not reveal this hidden menace, leaks which later develop on the roof betray it only too clearly.

Viskalt, on the contrary, is refined with steam up to a certain temperature and then air condensed under vacuum. In this way, all the desirable constituents are retained, especially the asphaltic resins so necessary to its stability and long life. Physical tests of Viskalt are thus really significant. You can be sure that it hides no malignant carbenes to work later damage to your roof.

Such delicate refining processes as Viskalt undergoes—critical temperatures, the control of vacuums, the fine regulation of a treated air stream which carries off unwholesome greases and acids—these can be properly controlled only by university trained, experienced chemists. Of such is the staff of the Richardson Refineries.

You can thus see how all these factors combine to make Viskalt truly stable, cohesive, pliant under stress or temperature changes—not merely as shown by physical tests but according to an inner chemical balance. Because of this, Viskalt provides you with a waterproofing bitumen *permanent* through years of hard service.

For further facts about the basic principles of *permanent* roof construction, consult the article for next month.

Viskalt is made by a firm backed by over fifty years of manufacturing experience. There is a Viskalt compound for every waterproofing need. For complete specifications just write the Construction Materials Division, Dept. 44-I

The RICHARDSON COMPANY
Lockland (Cincinnati), Ohio
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Viskalt
—Pliant Under Stress—

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1 Actually Prevents Lime Burning

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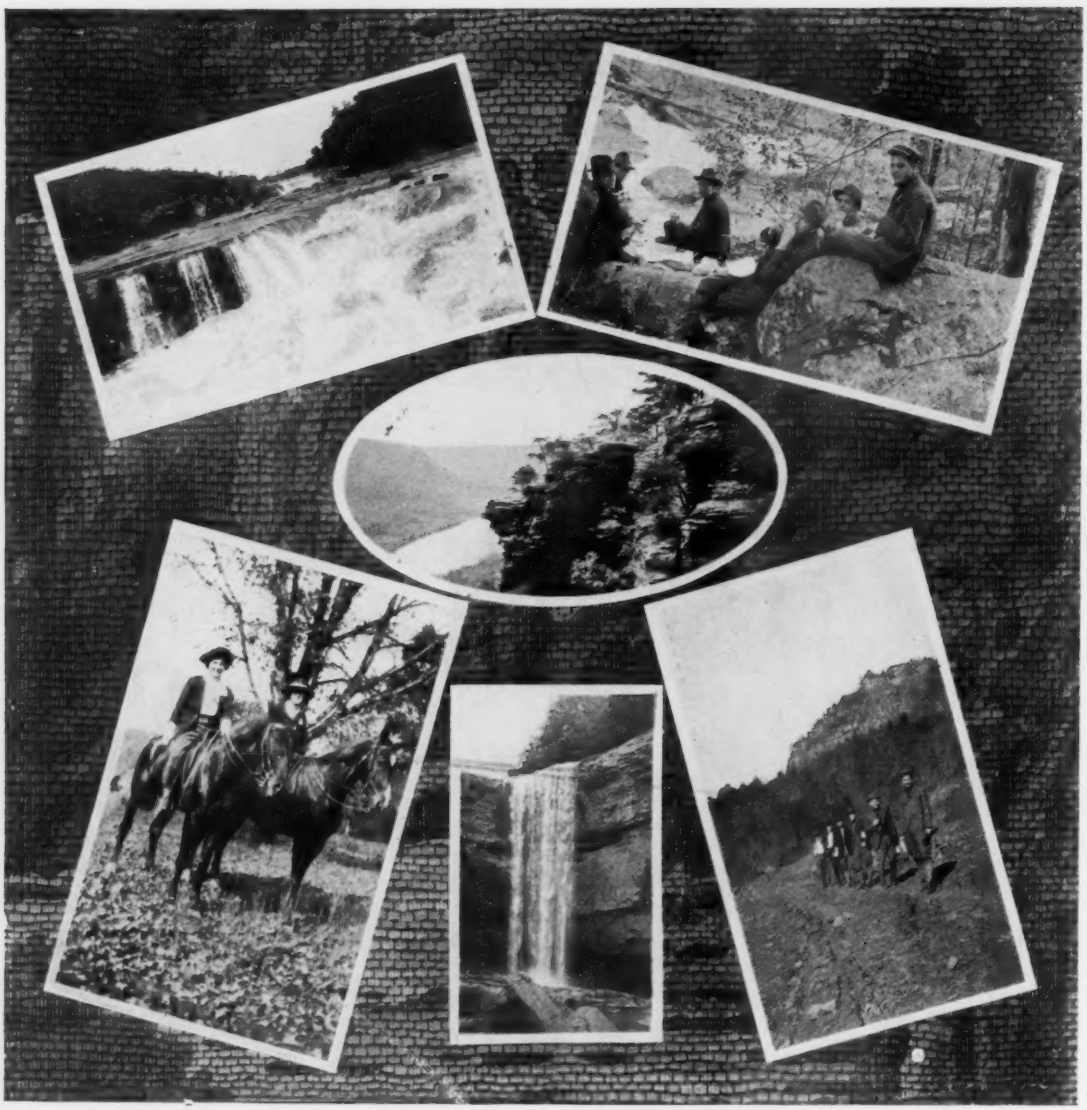

The Tennessee El

art of Industrial America

Where Life is Happier and Healthier

At the same time that a bountiful nature made Tennessee an ideal location for industrial enterprises, she made it an all-year around playground where the life of the average worker is happier and healthier. Tennessee's natural advantages together with her progressive achievements, have made this section an ideal place of residence for the home seeker.

The climate of Tennessee is delightful. It is mild, both in summer and in winter, with an average temperature of 60 degrees for the entire year. The territory has an elevation of approximately 900 feet above the level of the sea.

Tennessee's many attractions make it a great mecca for tourists. Some of the most beautiful scenery in all the world is afforded by Lookout Mountain, Signal Mountain and Missionary Ridge. The numerous rivers and lakes form a veritable sportsman's paradise. Tennessee's summer resorts are widely known. The miles of modern highways, the progressive cities and towns, the attractive homes, all these are factors which contribute toward making this section a desirable place in which to live.

The school system of the state is one of the best in the country. Universities, normal and professional institutions, public and private schools comprise the media for education. Over 97% of the white population of the state is native born and of native parentage—content to remain within its borders—and lower living costs make it possible to live in greater comfort and happiness than elsewhere. Write us for additional information about Tennessee and its opportunities for textile plants.

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1. Ideal climate the entire year.
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3. Market facilities — unsurpassed rail and water transportation.
4. Ample supply of intelligent and stable labor.
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IN the factory or industrial plant wherever heavy shop-trucks travel, wherever loads are dumped unceremoniously and wherever acid or grease may be spilt, there is just one pavement—*vitrified paving brick.* It does not rut, it does not crumble, it does not dust-up, it does not absorb grease or hold moisture, it does not disintegrate under acids. Slightly higher in first cost, that narrow margin is actually offset many times by extra years of service, low upkeep and continual satisfaction. *Suitable specifications for any service on request.*

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BECAUSE a man expects long wear, fit and quality in his underwear, he selects B. V. D.

The B. V. D. Company are pioneers in the manufacture of woven athletic underwear; and to their ceaseless care, from raw material to the finished garment, may be attributed the popularity of their famous product.

This company has been a client of ours for the past ten years, and it has been our privilege to plan, design, and supervise the construction and equipment of their mills and mill villages, and to build roads and individual homes for operatives.

Each one of the seven departments of our organization, acting individually or co-ordinating as a unit, offers the experience of specialists in every field of construction; and during the greater part of the last quarter century, we have been able to assist over 800 industrial projects.

You may be interested in at least one of our new and revised editions of "Picks to the Minute"—a short treatise on the textile industry; "Factories for the Future" and "Contentment Under Roof"; which we shall send you upon request; or, an appointment can be arranged with a member of this organization, to discuss your individual problems. This involves no obligation.

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Seven Callahan Features

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Invigorating fresh air, a natural resource to plant production, is yours with only the initial cost of mechanical sash operators. Callahan Sash Operators are built to serve you on any type of pivoted or hinged sash—wood or metal—with practically no maintenance expense.

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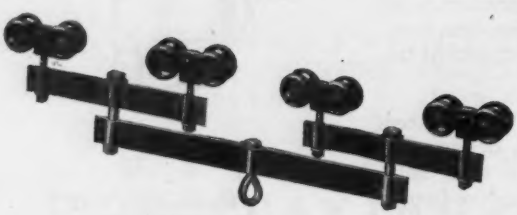

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CONSERVES LABOR---SAVES TIME AND FLOOR SPACE

Do your trucking on the ceiling and consolidate your conveying and hoisting operations.

Wagner Equipment includes a complete line of Switches, Crossovers, Curves, and Cranes. Carriers are equipped with high grade roller bearings and can be furnished with "Hyatt" Roller Bearings if desired.

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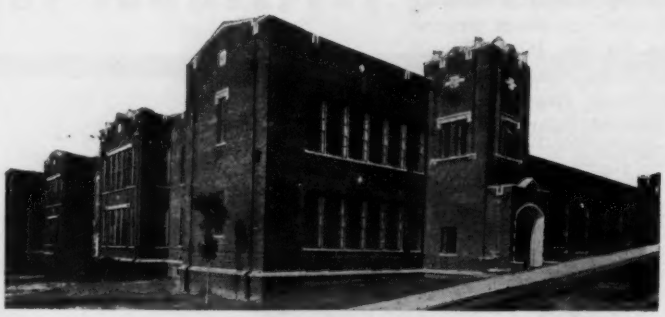
Wagner Manufacturing Company, Cedar Falls, Iowa.

YOU CAN DEPEND UPON BOCA SOLID STEEL SASH



Daniel & Bantell, Architects;
A. Ten Eyck Brown, Supv. Arch.;
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} Atlanta, Ga.

The view at the left shows English Avenue School recently completed in Atlanta, Ga. Boca steel sash, for it high quality, was approved by the architects and contractors for this building.

The Board of Education of the City of New York has approved Boca steel sash in ten public school buildings now in process of construction.

Advantages possessed only by Boca steel sash are: (1) all ventilators are equipped with **three point weathering contact** which makes them 100% storm proof; (2) the **patented lock joint** of all intersecting members keeps Boca steel sash square and rigid.

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Means a greater demand for your products. This demand necessitates increased facilities for manufacture and storage.

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One type of Maryland Metal Building—Size 70' x 144' x 12'
Adaptable for Warehouse or any Industrial use.

A type of Sectional Metal Building built today that can be enlarged when the demand arises. Fire-proof, lightning-proof and rust-resisting, because made exclusively of

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MEMO

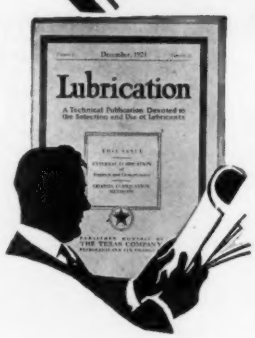
If we can do *one thing* on this page it's worth what it costs

And that thing is to remind you that TEXACO can supply your every oil and grease requirement

[*There is a Texaco Lubricant for every purpose*]

We said we wanted to do *one* thing, but we'll steal a little space for another

And that is to give you the opportunity of getting our Magazine "Lubrication." This magazine, published by The Texas Company, contains technical, authoritative articles covering the use of lubricants in many industries.
Anyone, whose business or profession guarantees his sustained interest in this important branch of engineering practice, may receive it.
Thus the present list includes: Engineers, mechanical executives, purchasing agents, technical libraries, universities—and YOU, when you reach for your pen or pencil and do the necessary.



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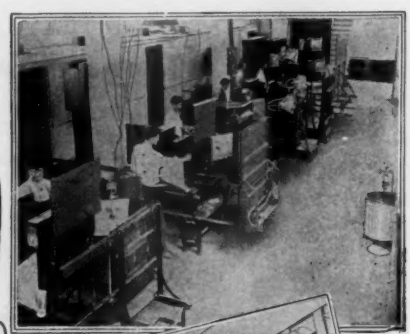

Battery of Cameras in the Photo-Engraving Department.

A Close Up View of One of the 6 Largest Color Process Photo-engraving Cameras in the World—Installed in the Photo-engraving Dept. of Jacobs & Co.

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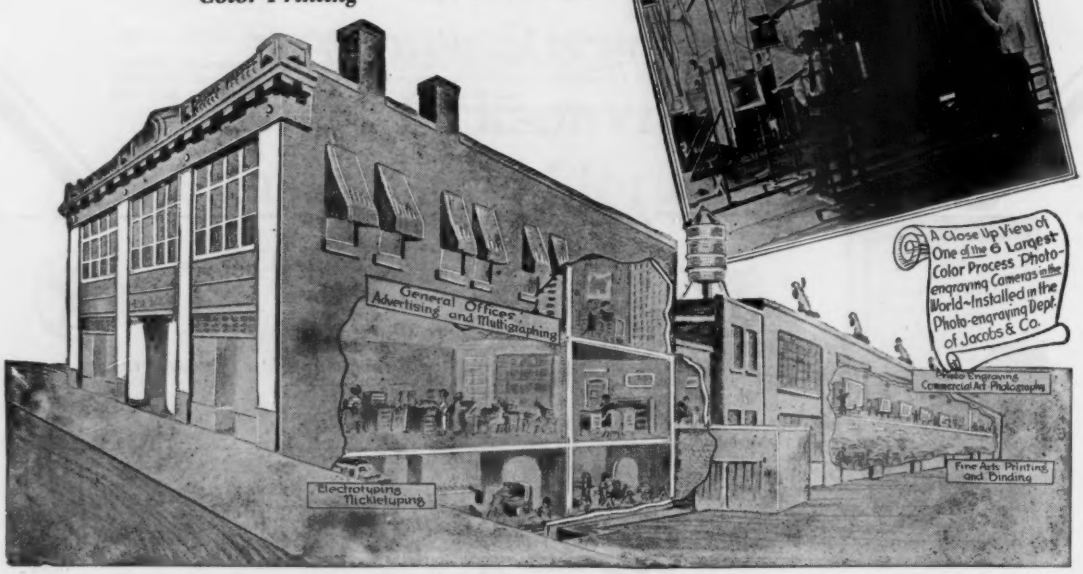
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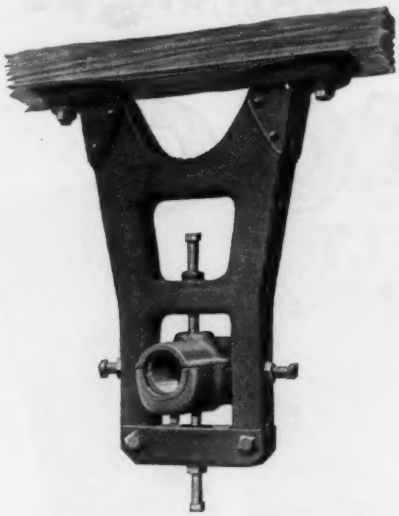

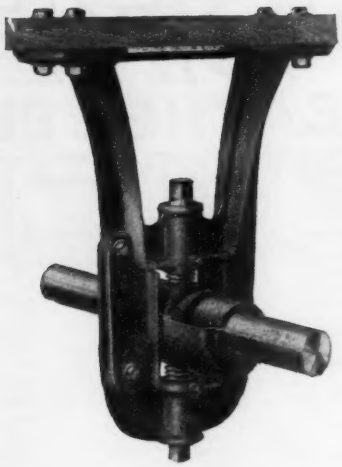

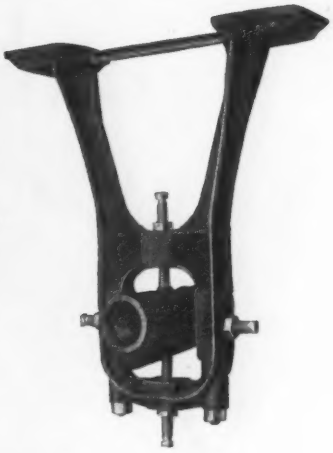

Visit our exhibit at International Textile Exposition, Boston, Mass., Oct. 29th to Nov. 3.

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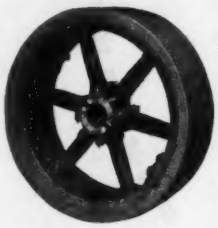
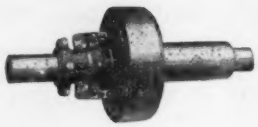


Your power roadbed is an important factor in determining your power costs. Dodge transmitting machinery insures balanced power; balanced power means less friction; less friction means lower costs and increased profits.

Dodge makes everything for the mechanical transmitting of power. Stock units can be purchased from your local dealer on the immediate delivery basis.



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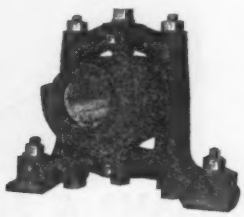


To make BELT JOINTS as strong as Solid Leather-USE-

COCHECO
LEATHER BELT
CEMENT

Authorities say that cemented belt joints when properly made have a strength equal to that of solid leather. Leather laced, wire laced and riveted joints have a breaking strength of from 35 to 85% of the strength of solid leather.

Obviously then, a cemented belt joint is the best, and COCHECO LEATHER BELT CEMENT is the very finest quality of leather belt cement that can be made—we know, because we use it in making all our belting.

Try a can and you will be convinced of its superiority.

Put up in ½, 1, 2 and 5 pound cans.

COCHECO BELTING

COCHECO BELTING

I. B. WILLIAMS & SONS, DOVER, N. H., U. S. A.

Manufacturers of the famous COCHECO BELTING

Eliminating Oil Spoilage in Washers

A battery of 12 Hyatt equipped washers recently made by Rodney Hunt Machine Co. for a large New England mill.

The oil-tight Hyatt bearing on a Rodney Hunt washer (with end of housing removed).

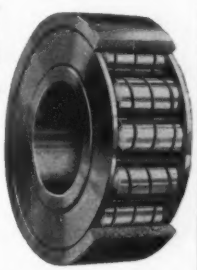
The spoilage of goods by leaking oil is eliminated on Hyatt roller bearing washers because the oil stays in the bearing housings.

For the same reason it is only necessary to oil Hyatt bearing washers 3 or 4 times a year.

In addition to these worth-while advantages, a reduction of from 25% to 30% in power consumption is secured when Hyatt bearings are used.

To secure the economies of Hyatt roller bearings it is not necessary to wait until new washers are needed. Hyatt replacement boxes for your present washers can be secured at surprisingly low cost.

Specify these economical bearings for your new and present washers. They will quickly pay for themselves and then pay dividends for years.



Hyatt Roller Bearing Company

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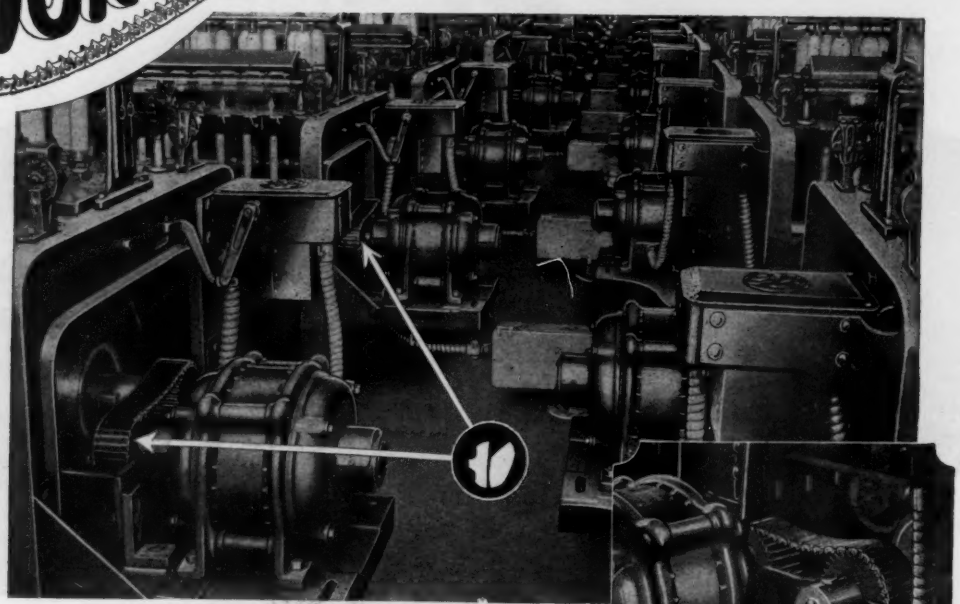
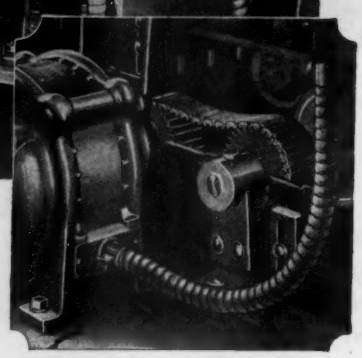
MORSE SILENT CHAIN DRIVES



Some of the Morse Drives in Efird Mfg. Co., Albermarle, N. C.

$9,000 Yearly Saving in this Mill



Close-up of drive to spinning frame.

C. G. Voss, Supt. Efird Mfg. Co., Albermarle, N. C., says:

"Our Morse chain drives are one of the most profitable investments we ever made. We have been using these chains for 7 years and now have one hundred and twenty 5 and 7½ H.P. drives on spinning frames, sixty-four 5 and 7½ H.P. drives on twisters, and four 10 and 20 H.P. group drives for carding machines.

"The most important result of installing these chains has been the absolute elimination of slip—a constant source of lost production where belts are used. We are now getting at least 10 percent more production from each spinning frame and twister. Since there are a total of 184 of these machines, the 10 percent increase is equivalent to saving the operating cost of about 18 machines, which we figure at $8,347.50 a year.

"The Morse chains have also eliminated the loss due to fly and dirt from pulleys and belts getting into the work —a further saving of $585.00 a year. More important than this saving is the greater satisfaction of our customers, due to the cleaner yarn produced. Since installing Morse chains we have yet to receive the first complaint on our yarn.

"Another factor which increases quality is the elimination of pulsating yarn at the traveler which is a common cause of broken yarn when belts, with their varying speed, are used.

"By eliminating belts we get a far better light, which makes working conditions more pleasant, and improves the quality of the work. Accidents, such as employees being caught in belts, belts breaking and striking someone, and pulleys breaking, are all impossible with a silent chain drive. The life of a belt on this work is not much over a year, but Morse chains on our spinning frames lasted five years, and those on our twisters are still going after nearly seven years of steady service. Repair costs have been very reasonable. We feel justified because of our experience, in recommending Morse chains for work such as ours.

MORSE CHAIN CO., ITHACA, N. Y.

There is a Morse Engineer near you

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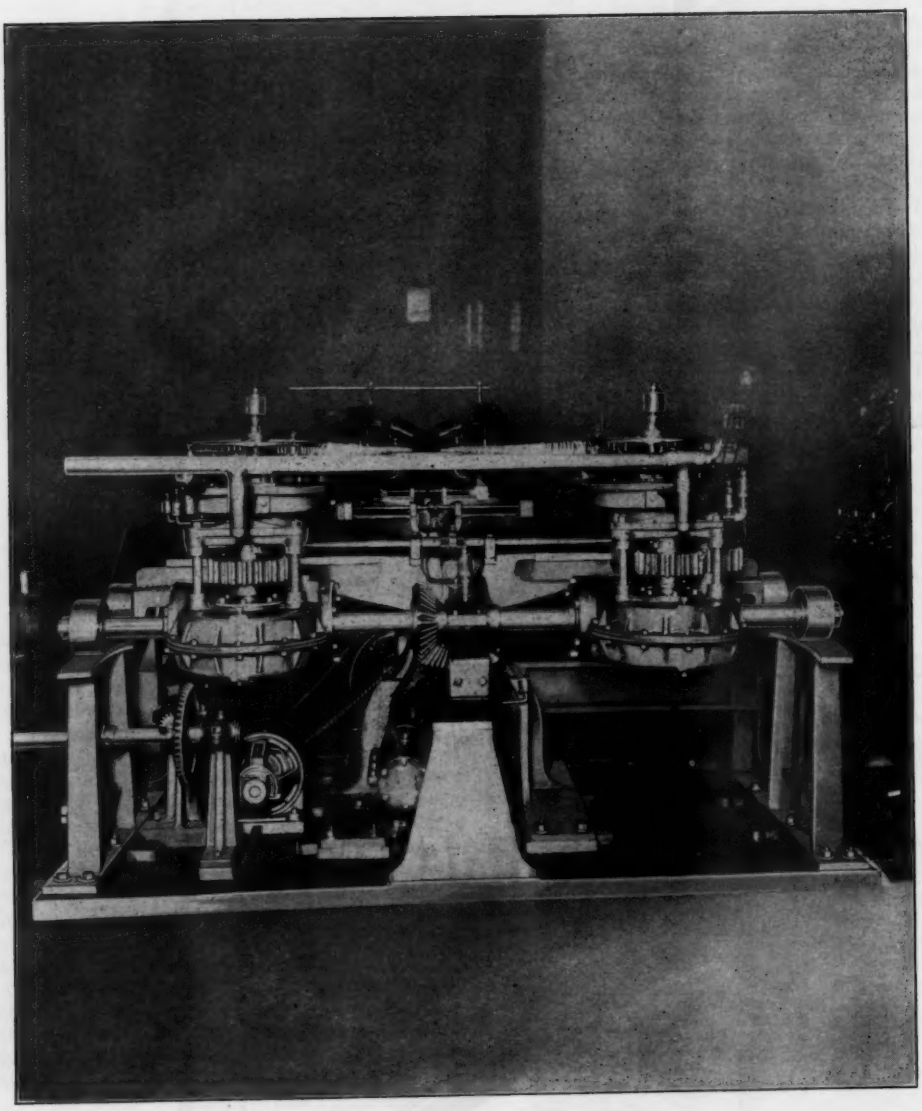

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With the Publishers—

GREETINGS

Looking down the vista of the past year many changes stand forth as economic milestones in the textile progress of the South.

Perhaps the most striking of these is the number of large finishing plants that have already been built, are now building, or are projected as early future developments.

Only a year ago commercial plants of this character might have been enumerated on the fingers of one hand to mark the progress of the last forty years, the period of elapsed time since the real rise of the cotton mills in the South began. But the necessities of war demands caused innumerable knitting mills in this section to install small finishing departments where dyeing and bleaching were successfully carried on, thus demonstrating that this work could be satisfactorily done at home and that the shipping of unfinished goods to other sections was largely a matter of habit.

The last twelve months have seen the development of many larger plants, both private and commercial—and the march of progress is just beginning.

Another outstanding economic milepost is marked by the stream of eastern capital that has been diverted into this section to purchase or build southern branches for established eastern textile organizations, the total sum amounting to many millions of dollars.

Then, as an accessory before the fact, there stand the wonderful accomplishments of the several big power companies whose millions of invested capital have harnessed the rivers of the South and diverted the energy stored in these rushing waters to the service of man. This low-priced and convenient power, interconnected and re-inforced against periods of low water by large steam stations contiguous to the coal mines, is transmitted over this favored section by a network of wires that allows a manufacturer to purchase ten horsepower or ten thousand horsepower with equal facility; and additional dams, storage basins, tunnels and transmission lines built this year will enormously increase the available amount of such power.

Space precludes the individual mention of other and almost numberless milestones that border this pathway of progress, but they are there and may be seen and appreciated by the careful student in search of truth about a section that is rapidly forging to the front in many lines of endeavor.

It is because we appreciate the active cooperation of our many friends and coworkers; because we are proud of the part we have taken in assisting in this progressive march forward, however small that part may have been; that we select this holiday season of good cheer to say out of the fullness of our heart—Greetings!—and wish for them and those associated with them the old, old wish—

A Merry Christmas

and

A Happy New Year.

AMONG COTTON'S READERS

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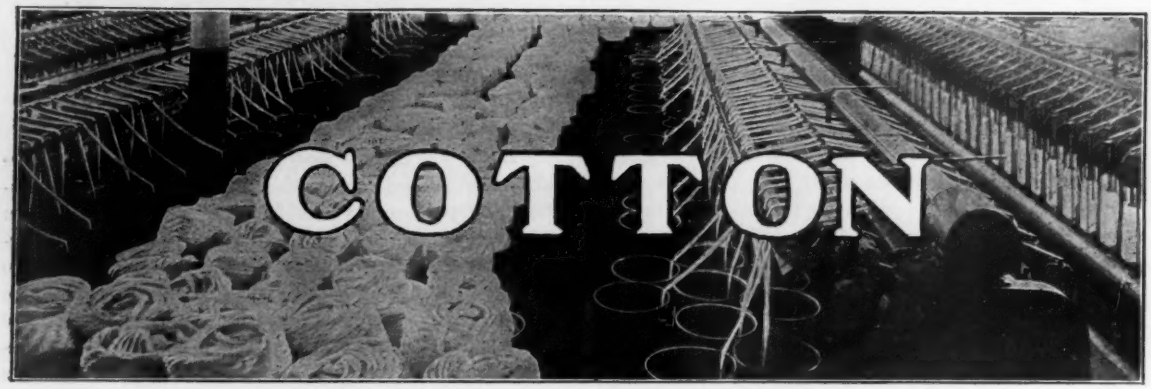

December, Nineteen-Twenty-Three

Important Questions Before Congress.

At no other time within the last quarter of a century has it been so important as at present that the sane-minded citizen and taxpayer keep a watchful eye on Congress. For not only are there many great problems whose solution calls for Congressional attention, but the present Congress is so curiously constituted that no one can tell what it may not do. Of all Congresses that have assembled in recent times, the Sixty-Eighth is probably the least responsible. It is the one which will be governed least by the rules of responsibility generally applied to and followed by the national legislative body.

Usually a Congress can be divined in considerable measure by the nature of the majority groups in control of its two houses. This is simplified when, as at present, one of the political parties has control of the organization of both houses as well as of the executive branch of government. This condition, however, in the case of the present Congress counts for little.

While the Republicans have majorities in each of the houses, those majorities in each case are nominal only, and even in that sense the control rests upon margins so narrow as would, under better conditions, make the exercise of full party responsibility very difficult.

The slight Republican majorities are fully offset by groups which, though classed as of that party, flaunt all allegiance to the dominant party as a cohesive agency of governmental control. Sympathetic groups are in the Democratic party's representation. These extremists of both parties can be counted on to work more or less in concert and in contradiction of the programs laid out by either of the parties to which they nominally belong. They are big enough to constitute an effective balance of power, which, when fully aroused, can at least prevent almost anything being done.

This condition frequently has prevailed in the House of Representatives. But it caused no great harm, for the Senate continued to be under the control of responsible agencies. The Senate always has had its "lunatic fringe" of agitators but about all the extremists there could do was talk. The House frequently adopted extremisms which usually were toned down or eliminated by the more conservative Senate.

Now the situation is somewhat reversed. The Senate actually is the center of extremist action and danger. The radical group there now can all but dominate the body, and with the support of the minority party this radical group might absolutely control the Senate. This support it would receive in fragments only if a Presidential election did not impend; but with that near at hand no one can tell how far even the thoughtful ones among Democratic Senators may go in giving encouragement to the radical group for the mere purpose of putting the Republicans "in a hole."

However, the principal committees in both the House and Senate still are presided over in the main by conservatively inclined members. But the best that these committees can do is to retard action of any kind. Once a subject gets to the fore on the floor of either house, then the extremist groups can exercise a tremendous influence.

These conditions mean that about all the best thoughtful persons hope for from the present Congress is—nothing.

Recently a group of authentically representative business men laid a proposed program before President Coolidge. This includes the subjects of prime interest to the business world to which Congress may give attention at the present session. The first on the list called to the attention of the President is international relations, with specific reference to our joining the World Court.

The second is railroad transportation. The big issue there, though it may not come definitely to the front, is the question of government ownership.

The third is the merchant marine. There also the big question is that of government ownership or operation of the vessels left over from the war. Direct governmental subsidy for private ownership and operation is, for the present at least, a dead issue.

Then comes taxes. There is very little likelihood of these being reduced consequentially. The danger is of increases, not at once, but later on account of extravagances pledged now. This involves the proposed soldiers' bonus which, it seems practically certain, this Congress will grant in some form. It will kill all hope for any worthwhile reduction in Federal taxes for the next ten years; in fact, the bonus probably will mean a large increase in Federal taxation. It will be very difficult for this Congress to make any intelligent readjustment of taxes, such as a further lowering of the surtaxes on incomes, as recommended by Secretary Mellon.

This Congress must do something with regard to immigration, for the present temporary three per cent arrangement expires by default within a few months. A permanent immigration policy may be worked out, and, if so, the prospect is that a severly restrictive one will be adopted.

But the subject which probably will be most discussed by the present Congress is agricultural relief. And the prospect is not good for the enactment of wholesome legislation with regard to it—either for the farmers or the country. All kinds of quack nostrums will be proposed and some perhaps will be adopted. But this Congress isn't apt to go to the extreme of price-fixing or of Government underwriting of farm or any other products.

The Sixty-Eighth is going to be an interesting, even though it is not a constructive, Congress.

It is well to keep an eye upon it.

The Changes in Official Cotton Standards.

Shortly after August 1st of this year inquiries began to come to COTTON in reference to the recent changes in official cotton standards. In order to present this matter in the clearest manner and at the same time have it officially authentic, an inquiry was sent to Dr. William R. Meadows, in charge of the Division of Cotton Marketing, Bureau of Agricultural Economics, U. S. Department of Agriculture.

Dr. Meadows' reply was as follows:

Two important questions are raised by your inquiry—

(1) What changes in the U. S. official cotton standards for grade of upland cotton were made by discontinuing the old standards and establishing the new?

(2) What is the present legal status of the old standards in everyday business transactions?

Those interested in the first of these questions are referred to Service and Regulatory Announcements No. 72 which gives the orders of the Secretary of Agriculture dated July 26, 1922, that promulgated the new standards that became effective on August 1, 1923. A copy of this bulletin is enclosed for your ready reference and any of your readers may secure a copy free of charge upon request. On page 2 of this publication you will find a statement of the changes as they appeared to us which were made in the grade boxes when the new standards were established. The three following paragraphs which bear directly on the subject are quoted for the convenience of those who do not have a copy of this bulletin:

> "In the white grades the changes are not considerable and the new standards represent the nine grades for which the standards were originally established. The most noticeable changes are in Middling Fair and Strict Good Middling, which in the new boxes are somewhat less creamy and admit a trifle more leaf. The reason for this change is that in the old standards for these grades too large a proportion of creamy cotton was allowed in relation to the lower boxes. Great care has been taken to graduate all of the new boxes so that the steps between the grades shall be as nearly equal as practicable.
>
> "The extension of the boll weevil depredations into practically all sections of the Cotton Belt has caused the greater part of the American crop to show some slight discoloration, known as boll weevil spots. The new white standards provide for such color in the white grades of Strict Middling, Middling and Strict Low Middling, but do not contain as much heavy spot as bales 3 and 11 of Strict Low Middling, 7 of Low Middling, 5, 6, 8 and 9 of Strict Good Ordinary, or 3 and 7 of Good Ordinary of the old standards.
>
> "The old standards for Yellow Tinged cotton have never received the complete recognition of the cotton trade. The new standards, being much lighter in color, are designed to conform more closely to American trade ideas."

The new standards were recommended by a committee of 23 cotton men representing all branches of the industry from producer to manufacturer. It was the opinion of the committee as well as of the specialists of the Department that the standards for the so-called nine white grades were neither raised nor lowered in making the change. While some additional broad leaf was introduced in some boxes, it was offset by using a brighter and bloomier character of cotton. It is true that boll weevil spots were allowed in the Middling and Strict Middling grades which had hitherto been considered to be "white," but it was believed that the color of these spots is very fugitive and that such spotted cotton would bleach perfectly without additional cost, and, therefore, it was placed in the white standards so as to take care of the crop as it now comes to market under boll weevil conditions. The changes in the standards for tinged and stained cotton are much more marked and these standards now represent the best practice of American cotton trade in the classification of this kind of cotton and are certainly a great improvement over the old standards for such cotton.

Those of us in the Department who are familiar with the preparation of standards believe that the changes were too slight to affect the value of the boxes and that the new standards meet the conditions which have arisen in the cotton belt as the result of the spread of the boll weevil. We think that in the course of a short time the cotton trade will adjust itself easily to the new standards and will recognize the adaptability of the standards to present day conditions of production.

In order to reach an agreement with Liverpool and the Continental cotton exchanges on standards, it was necessary to modify four grades of the official cotton standards, namely, Good Middling, Strict Middling, Middling, and Strict Low Middling. These changes were worked out during July, 1923, in conference with representatives of the Liverpool Cotton Association who held proxies for the other cotton exchanges of Europe. These new standards have fewer high colored bales and contain less color due to the presence of boll weevil spots. These changes in the grade standards will become effective on August 1, 1924, on which date Universal Standards for grade and color for American cotton will have reached, it is hoped, a permanent form.

Turning to the second point of your inquiry regarding the legality of the old standards in everyday commercial transactions, I wish to refer you to Section 2 of the Cotton Standards Act which clearly prohibits the use in interstate and foreign commerce of any other standards than the official cotton standards of the United States. Accordingly, the old standards are now obsolete and no reference to them is permissible in interstate or foreign commerce.

In this connection I wish to quote the essential parts of the recent opinion of the Attorney General bearing on the effective date of the Cotton Standards Act. He holds as follows:

> "All contracts made after March 4, 1923, relative to the subject matter embraced in the pro-

visions of the United States Cotton Standards Act are entered into with the knowledge of and subject to the provisions of that Act.

"And, all contracts entered into before March 4, 1923, (involving shipment on and after August 1, 1923, the effective date of the Act) relative to the subject matter to which the Cotton Standards Act applies are subject to the provisions of that Act.

"'Such commerce is solely regulated by Congress and when parties make contracts to engage in interstate commerce, they are held to do so upon the basis and with the understanding that changes in the law applicable to their contracts may be made. There can, in the nature of things, be no vested right in an existing law which precludes its change or repeal, nor vested right in the omission to legislate upon a particular subject which exempts a contract from the effect of subsequent legislation upon its subject matter by competent legislative authority.—Louisville & Nashville R. R. vs. Mottley, 219 U. S. 467, 484 (quoted from Fitzgerald vs. Grand Trunk Ry. Co., 63 Vt. 169).'

"Therefore, my conclusion is that the United States Cotton Standards Act invokes a legitimate power of Congress over interstate commerce and its provisions apply to shipments made on or after August 1, 1923, regardless when the contract was made."

In addition to national legislation certain of the southern states, notably Georgia, Alabama and Oklahoma, and some others the names of which at present cannot be stated with exactness, require the use of national standards in intra-state business. It therefore seems to be of doubtful propriety to offer cotton for sale even in purely intra-state transactions, through reference to the old U. S. official cotton standards. It is safer and more desirable from every standpoint for such business when based on standards at all to refer to the official standards which became effective on or after August 1, 1923. It is well known that the law permits transactions by actual sample or on the basis of a private type which is used in good faith and not in evasion of or substitution for the official standards.

Gold Still Pours in Upon Us.

Approximately one-half of all the world's gold is now in the United States, and there still pours in upon us a great surplus of this precious metal.

During the nine months ending with September, we imported a total of $220,522,000 of gold, for which we have about as much need as for dust from the comets which float in the heavens. We may make good use of it, and, on the other hand, it has "white elephant" potentialities. The imports for the first nine months of this year were about $10,000,000 above those of the same period in 1922, though the inpour was much lighter than during and immediately following the war. Exports still are negligible, but have been larger in 1923 than during last year. For the first nine months of this year they amounted to only $25,878,000.

We no doubt are importing considerably more than the total of gold production outside of the United States, and added to these stores are our own production of this metal, less that used in the arts.

The gold situation is one of the most problematical that affects international affairs. So long as the worth of the world's currencies is calculated in terms of gold this situation more than any other has to do with the flooding of many countries with next to worthless paper money and the wide fluctuations in foreign exchange. If gold continues to concentrate in the United States, it will be impossible for Europe to get back on a gold specie basis of currency unless we find some way to ship back much of the gold that still is being shipped to us. How this may be done nobody seems to know. As matters now stand we could do it only by making large gold loans to Europe or buying with our gold enormous amounts of European goods or securities. If the gold standard ceased to govern the world's currency ratings, the great volume of gold we have accumulated would be rendered all but worthless.

The currencies of only two of the big nations of the world are now truly on a gold basis, the United States and Great Britain. Yet about one-half of the gold we have been importing comes from the latter country. We still are receiving consequential amounts from other lands. Germany has sent us this year about $50,000,000 worth of the metal.

This inflow of gold indicates that world trade still is carried on in a highly artificial manner, and is, therefore, subject to violent reactions.

While many of the predictions based upon it—such as the continuance of wild inflation which began concurrently with this inflow during the war—have not been borne out by events, it is a subject to which should be given more careful study than it has received.

It might be wise for the Federal government to set up a commission of experts to inquire into it before, as possibly may happen, it brings on serious embarrassment.

Industrial Accidents.

Whatever one may think about the expansion of government along ruling lines, no one can question the worth of governmental activity, properly conducted, looking towards the development of information that cannot be procured through other agencies.

It is thus interesting to note that the United States Bureau of Labor Statistics is undertaking to make meticulous survey of the country as to industrial accidents.

"Safety First" agitation and other influences operating during the last decade have brought about considerable reduction in the number of most kinds of accidents injurious to persons in this country. The number of one kind continues to grow atrociously. Every two or three years now more Americans are killed by automobiles than were lost in our military services during the World War. Increase here is due in some part to the growing number of automobiles coming into use—even the accident rate per thousand of automobiles steadily has declined in recent years.

There has been considerable curbing of industrial accidents. However, every year many more persons are seriously injured, if not killed, in industries than were listed among our losses during the late war. Ethelbert Stewart, of the Bureau of Labor Statistics, estimates that deaths resulting from industrial accidents run from 12,000 to 30,000 a year, while the total of disabling injuries are estimated in the millions. A great many of these could be prevented, and, aside from considerations of humanity, profitably so for all concerned.

Mr. Stewart estimates that the wage losses due to disabling accidents is not less than one billion dollars a

year, and that reimbursements amount to at least $200,000,000 a year. Thus accidents are very costly experiences both to employers and employees.

However, good statistics as to industrial accidents for the country as a whole are not available. Nor are there any very good comparative statistics, that is, ones which give the facts as to various industries.

The Bureau of Labor Statistics proposes to develop the facts both for the country as a whole and for those hazardous industries for which no good statistics are available.

When these figures are in hand no doubt steps can be taken to make further and greater reductions in this sort of national waste, for waste of the least excusable kind it is in biggest part.

America and Its Cotton

BY JOHN S. BARROWS.

During the very recent past peculiar conditions have been encountered in two of the great staple products of the United States, representing two great agricultural areas —cotton and wheat—the producers having expressed a desire that the Federal Government should assist in maintaining the selling price to the producer at such a level as should insure a reasonable profit, commensurate with the profits on other commodities, and in keeping with the wage situation; the extravagant figures of which making production of field crops difficult and expensive.

It is hardly necessary to argue the matter, that the scarcity of field labor, and the high prices demanded for what is available, has been making the production of these two great field crops difficult, and causing producers to reduce their acreage, simply because they could not manage what had hitherto been a normal area. This situation has developed and spread widely since the automobile became the great feature in our domestic, social and industrial life. It is a fact that with the large army of men required in all the various lines of automobile manufacture and use, the supply of men for farm work is inadequate, and growing more so. To meet this situation is a problem, which admits of several theoretical solutions, but the condition continues to stare America in the face, and theory remains useless.

In the case of the cotton crop, efforts have been made, with varying results and no success, to reduce the acreage; at the same time the invasions of the boll weevil have had disastrous influences; but with both influences at work, the situation has not been relieved, and the demand for cotton fiber continues unabated, and with increasing tendencies.

So tense has become the situation in the cotton industry that it has been intimated that either the world must raise more cotton, or use less cotton goods. That is a simple fact, but a very childish excuse for an industrial condition which has in itself a part of the resources that will restore its strength. The American cotton crop has been the mainstay of the cotton users of the world; but so inefficiently has it been handled between poor agricultural methods and political and other manipulations of the market, that foreign buyers and consumers have moved in every way to secure cotton fields in their own or nearer countries, where they might be freed of the necessity of going to America for the bulk of their supply.

It is only recently that the height of imbecility has been shown by the expression of a weekly journal devoted principally to the industrial, commercial and agricultural interests of the South, to the effect that Europe has been holding off steadily its purchases because of the present prices of cotton, "due to the *great blessing* which has come upon the South of a smaller crop." Such a ridiculous statement stamps the writer of such doctrine as thoroughly ignorant of economics; for while a short crop of cotton with a relatively high price may be of a temporary benefit to the South, that benefit will be neutralized ultimately when prices of commodities which the South does not produce but does consume, are advanced to correspond to the inflated prices of cotton. The South can not do a "jug-handled" business with the rest of the world or with the other parts of the United States, any more than the wheat farmers can expect the consumers to pay them a high price for their wheat and they be able to buy their supplies at a low price. Prices and costs of commodities must be equalized throughout the country, if all the people are to share in the *"blessings"* such as is imagined are being meted to the South.

To imagine that the South holds an unassailable position as perpetual purveyor of cotton for the world is absurd; for though American cotton has been the principal supply in the early past, and is still the mainstay, it by no means will continue to monopolize the business. The normal cotton production of the world is about 22,000,000 bales, of which America ought to provide about 14,000,000 bales annually, India about 5,500,000 bales, and Egypt, Russia, China and the other cotton-growing countries the remainder.

That this distribution of the supply for the world each year will continue indefinitely is not to be imagined by a sane mind for a moment; for during the past half century, while the American crop has increased, the crop in foreign lands has increased in a greater proportion, and the indomitable spirit of the British is sustaining unprofitable fields in the hope of future satisfactory results. Every short crop in America is an added stimulus to improve the cotton lands in India, Egypt and wherever the British flag flies; and among these scattered fields those of Australia are promising, for the lands under cultivation produce about twice as much cotton per acre as the average American fields; the white labor there is cheaper than the black labor in America; at the same time, the boll weevil has not reached the Australian fields. Recently intelligent cotton men have declared the Australian climate and soil unsurpassed in the world for cotton raising.

The Belgian Congo contains great opportunities for cotton growing; Brazil is being exploited as a strong rival for the American states. The kingdom of King Cotton faces the danger of King Belshazzar's of being divided and given to another. Just because the southern states of the American Union have held the monopoly of cotton raising so many years is no reason for the condition existing as long again; and the prospect is decidedly against

any such condition, especially if any friends of the industry consider a short crop as "a great blessing."

While at present the South holds the predominant position as the great producer of the world's raw cotton supply, the reduced crop of this (1923) year; the high prices; the continued talk of reduced acreage all serve to stimulate efforts by foreign consumers everywhere, and Britain in particular, to develop other sources of supply. So the talk about "a blessing" in 1923, may result in conditions that will cause that "blessing" to be remembered more as a curse a few years later.

To a great extent the future of cotton raising in America, and in the present "cotton" states of the South in particular, depends on the cotton farmers themselves. It is not a matter of price, boll weevil, acreage, diversification or any of the various excuses and reasons offered for a short crop. It is a matter of excellence of fiber, and proper quantity of the most desired grade, and of such grades as are needed for particular purposes. It is time the heedless method of cropping was stopped. In the majority of cases the planters raise a wild plant, not developed to its highest particular capability. They raise it this year because they raised it last year. They do not select their seed; they do not recognize the possibilities of depreciation of efficiency in the lack of seed selection or of cross pollenization, from the mixing of poor strains in the field or of the seed in gins. They do not study the plant as it grows from the first break of the ground to the time the opening bolls show the ruling characteristics. They do not keep calendars of areas nor test the seeds for different soils. They fail to recognize the fact that the plant can be developed upward or allowed to breed downward. They are doing nothing much to secure standard strains of seeds for different localities and different soils.

In fact, under the present conditions, over 30,000,000 acres of soil are planted to a tatterdemalion tribe of cotton plants, which are of various breeds and live a gipsy life, taking much from the soil and giving scanty return. There are 30,000,000 acres in cotton plants trying to do what half the number should do twice as well. There is no reason but gross inefficiency on the part of the planters why every acre should not average one bale of cotton. Some will do better, and are doing so, because they are managed by progressive students of cotton growing, otherwise land is half-cultivated. It is improperly sown, poorly handled, imperfectly treated for insects, picked in a slovenly and wasteful manner, and allowed to wait the next crop without attempt at prevention or destruction of insect pests. It is no wonder that the cotton crop is a failure since such un-American methods prevail. There are a few men of intelligence studying the cotton plant, trying to tame it and make it productive; but there are too many of the other class who by their lack of even semi-intelligent methods hamper the efforts of progressive farmers because of the natural tendency of the plant to depreciate through cross fertilization. Such farmers consider the theoretical farmer as an impertinent interloper on the primeval methods, and as a result are willing to allow the sceptre of King Cotton to slip away from America because of the low standard of intelligence applied to this work. The general effort of the cotton farmers throughout the entire area attempted to cotton should be to secure the largest crop from the least acreage possible, with the minimum of effort, but the maximum of care.

Human slavery has been eliminated from the cotton fields; but the cotton fields are slaves to farmers who in turn are slaves to prejudice and shiftlessness, when a limited knowledge of botany and horticulture might expand their practical knowledge of farming into a profit-making ability. When one enthusiastic student of cotton succeeds in making 120 different crossings in his breeding plot, using varieties of cotton from all over the world, thereby establishing definite principles of cotton growing, it shows the possibilities. If he can accomplish so much, the average farmer at least might be able to discover some of the simplest principles of horticulture and apply them to his immediate conditions. There is no royal road to cotton productiveness, but there is every opportunity for the American cotton farmers to reduce their acreage, increase their crops, improve the grade and put American cotton on a commercial basis that will assure its stability as an industrial property, and yet be an available resource in the reach of all requiring its properties in the many ways of modern invention, and at reasonable prices. American cotton must continue King of the world; but the stability of the throne depends entirely on the farmers who today are producing its foundation.

From the experience of the cotton industry, the corn industry may take an inspiration; and if this be treason, let them profit by it.

Southern Education Convention.

From June 9th to 14th, 1924, the Southern Education Convention will be held at Textile Hall, Greenville, S. C. The primary purpose of the conference will be the discussion of means and methods for improving the work of city schools, rural schools and colleges, in the southern section.

In connection with the convention, a great exposition will be held at the Hall, displaying materials and equipment used in the construction and furnishing of schools and colleges.

It is proposed to invite all persons interested in education, including executives of cotton mills, bankers, business and professional men, and parents of school children, to join in the discussion of present needs. A tentative program calls for special days, among which is a day set apart for a meeting of legislators, and the general assemblies of North and South Carolina and Georgia will be invited to attend.

This will be the first gathering for this purpose in which laymen are expected to take a part in the deliberations. The speakers will be men of national reputation, it is stated, and 10,000 people are expected to attend.

Because of the intimate interest taken in education by cotton mill executives, this convention should have an appeal for them. Better school buildings, better seating and lighting, and educational equipment for pupils will be discussed. The gathering has the endorsement of the National Education Association, those manufacturers exhibiting at the expositions of that organization will be requested to take space in the southern show.

William G. Sirrine, president of Textile Hall Corporation, Greenville, S. C., is in charge of the convention and show, and announces that further details will be given out later as other plans mature.

Yarn Changes in Spinning and Twisting

A Discussion of the Mechanical Details to Consider When Making Such Changes, Together with Some Suggestions on Records and Other Features

BY R. A. SONIAMAN.

The Modus Operandi of Changing.

Who shall have charge of the actual changing of a machine? If a small room, the second-hand; if a large room, the section-hand, under the supervision of the second-hand.

The thing to bear in mind when about to change a frame is that it should be done in the shortest time possible. By so doing, there is the least unnecessary loss in production, and the regular routine suffers the minimum of disruption.

Therefore, it behooves one to see that everything and everybody is ready. Twist and draft gears, travelers, yarn, workers. It is advisable to use all the spare-hands and other extra workers when making a change and also when piecing up the frame changed to obtain the assistance of contiguous spinners or twisters.

For the sake of simplicity, the actual changing of a twister will be discussed, it being remembered that the same principles apply to spinning frames. The procedure may be outlined something like this:

1, stop machine. 2, cut ends. 3, run back ends on spools. 4, remove spools. 5, remove bobbins. 6, remove travelers. 7, wipe rails and rings. 8, change bands (if necessary). 9, oil spindles (optional). 10, clean troughs. 11, lubricate rings. 12, put yarn in creels. 13, thread ends. 14, put on empty bobbins. 15, piece ends. 16, wind traverse motion.

These various points will be taken up one at a time in conjunction with accompanying incidentals necessary to changing. The person carrying the yarn from the spoolers

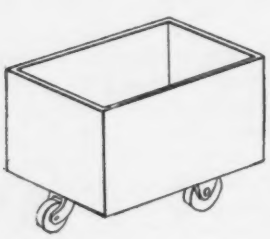

Fig. 1

Fig. 2

to the twisters should have an empty truck for each side of the twister. Any yarn on top of the creel should be now thrown into the receptacles used for this purpose. Modern practice now is to use fiber trucks. (See Fig. 1.) These can be filled and then readily pushed out of the way or to another machine.

Two persons should cut the ends. This is done after the frame is stopped. One person on each side running a sharp knife blade across the ends. The frame is then started up so that the cut ends can be run to the bobbins. The spools in the creels must also be turned so as to wind up the residue left hanging. This should be delegated to another person on each side, who follows the one cutting the ends.

If the creel is of the usual two-story type, one hand is placed on the top row and the other on the bottom row of spools. With hands thus held the person moves in that direction which will cause a rotation of the spools sufficient in scope to wind up the hanging end.

It is sometimes the custom to run the hands over the spools in the manner just described while the frame is running. No cutting of ends is done. Such a procedure, however, should never be tolerated on ply work, because the individual strands composing an end usually break in different places; whereupon they curl up and are difficult to get together again, thereby greatly augmenting the possibility of split ends.

Having cut the ends and wound the tails back on the spools, the latter should be thrown into the trucks. This operation should be carried on simultaneously on both sides. A plan, often very advantageously employed is to throw all full spools into one truck and push this truck to the storage space, or put the spools on top of another frame of that particular count. The small spools can then be taken to the spoolers and re-filled. It is presumed that each spool has its special count and quality identification mark. If not, a ticket or tag must be attached to the truck giving particulars about the counts and other information necessary.

While this work has been going on, workers on each side will be removing the full bobbins from the spindles, marking them with the proper marks, and placing them in the doffing boxes. Immediately subsequent to this operation the travelers should be changed. As old travelers when sold in quantities are worth something it is advisable to have receptacles for them rather than to have them dropped on the floor and then swept out with the dust, etc.

It is advisable when changing from a coarse to a finer count to thoroughly cleanse the rings of the accumulation of grease. lint and other matter, for such dirt tends to hinder the movement of the finer traveler used. When the reverse—fine to coarse—takes place, it is not so necessary to clean the rings.

If the counts to be put on are to have twist inserted in the opposite direction, the bands must be changed, or rather turned, and the opportune time to do this work is when the ring rails are being cleaned. Care must be taken that the bands are not mistreated, a condition to which a careless operative will sometimes subject them. It is also essential that when the spindles are removed to permit moving the bands that each spindle be returned to its respective base. Spindle blades do not, as a rule, wear uniformly, and to jumble them about indiscriminately means shaky spindles with the consequent slack yarn.

To put a little oil in the spindle bases when reversing the bands is a good plan. Troughs may also be cleaned thoroughly because there is no hindrance to a free and com-

plete movement of the waste. Skewers may be cleaned and oiled at this time.

Accumulations of waste on the spindles can also be removed, and parts of the machine that otherwise would be inaccessible may be opportunely gone over.

Worn roller bearings may be replaced at such a time and gear studs and brackets can also be examined for wear and their immediate future repair decided upon.

Coming to the task of putting on travelers, a warning should be given in regard to the practice of using an ordinary twister bobbin to force the traveler onto the ring. Such use of the bobbin will result in bent spindles. It is better to have a wooden cylinder made which will be of sufficient diameter to force the traveler into place without injury to the spindle.

In making the traveler forcer (Fig. 2, which is a side view), it must be remembered that the diameter cannot be as large as that of the ring. If it were, there would be no room for the traveler; consequently, no action of the forcer. A good way of gauging the size of the forcer is to put on a traveler and measure the distance from the traveler to

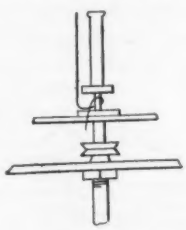

Fig. 3

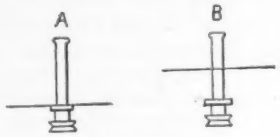

Fig. 4

the spindle, allowing a trifle of a space between the traveler and the forcer. Another good plan is to make the forcer of such a diameter that there is a sixteenth of an inch or so between it and the traveler when the forcer is centrally located. Now if the bore of the forcer be enlarged quite a little larger than the size of the spindle, the differentiating space taken up by the several sizes of travelers can be readily compensated for by the liberal movement permitted the enlarged bore of the forcer. When the travelers have been put on, it is usual to lubricate the rings.

While the ring rails and travelers and cleaning are being attended to, other workers can place the spools or cones of the new count into the creels. In doing so they must watch out that each cone is so put on that it revolves in the same direction as its fellow cones; otherwise the tubes, revolving some one way, others in the opposite direction will look as though chaos had broken loose. Such a course is certain to result in the friction of the ends against the cones which has a tendency to raise the fibers of the strand —an undesirable condition.

After threading, if the yarn is strong enough, the ends can be lapped around the spindle blade and the empty bobbins placed on top of them. Fig. 3 shows an end so placed and a bobbin about to be pushed to its seat on the spindle.

The ring rail should always be at its lowest point when this piecing operation takes place; otherwise a long end will result which may entangle with the adjacent ends when the bobbin is lifted from its spindle during the running time of the machine.

To show how the position of the ring rails affects the length of the doffing tails, consideration should be given to Fig. 4, a. Here the ring rail is at the bottom of the traverse, and the doffing tail will be very short. At b is shown the ring rail about 3 inches from the bottom. As a result, the doffing tails will be anywhere from an inch to 4 inches long, depending on where the end breaks.

Fine yarns, on account of their delicateness, may require to be pieced up with the frame running, the end being wrapped around the bobbins instead of the spindles. Sometimes it is necessary to start the ends like those on a spinning frame where the ends have ruptured after doffing—using a full bobbin, holding the latter under the chin, and piecing the end from the full bobbin to the end from the creel.

Of course, the workers who put the cones or spools in the creels must be taught to put in large and small cones alternately, and must also be required to see that each unit has its proper identification mark. Mixtures are very apt to occur at the changing of counts and, therefore, too much caution cannot be exercised to obviate this condition.

It is essential from the standpoint of good twisting to have the spools or tubes in the creel run out in consecutive order rather than to have them run out in bunches, so to say, or all together. A twister tender is better able to attend to her other duties when the amount of creeling is a regular or constant quantity.

One of the very first things to look after, then, when about to change, is the size of the units that are to go into the creels. Some men make the mistake of putting in all full spools or tubes as shown in Fig. 5, a. Considerable time must elapse before they become sufficiently broken up to permit uniform creeling. It is far better to have the spools filled to various sizes at the spoolers because the doffing at that process is a simple affair. The spools of such various diameters will, when properly distributed

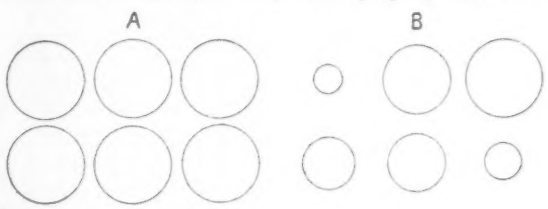

Fig. 5

about the creel, present an appearance like that depicted in Fig. 5, b.

It should here be said that yarns for certain classes of goods are required to be knotless, and that in such cases the procedure outlined will not apply to the best of advantage. Rather, the spools must be kept uniform in size. Then, when they are run down to about one-quarter full, or to such a size that will not permit a full doff of the bobbins, without some spools running out, the spools are broken out at doffing and a full set substituted.

On that type of twister which is fitted up English style and with pigtail guides set in a top roll traverse back of the water trough, there is a certain way of threading that is worth while teaching the workers. In this type of twister the glass rods in the trough are held tight by means of clamps soldered to the bottom of the trough. These clamps are evenly spaced for each length of rod. All ends between two of these clamps should be threaded and left lying loose on the water, as indicated in the illustration, Fig. 6, a. The ends are then gathered together in one bunch, Fig. 6, b, and put under the glass rod at the

same time. This is a much quicker method than that of bringing the individual ends under the glass, one at a time.

When it is customary to doff the machines running, it is advisable on those machines on which it is necessary to piece up with the frame running to have the workers start the piecing at the point where the doffer starts doffing the frame. The reason for this is that if the ends are pieced on the last side simultaneously with or before those on the first side, the bobbins will be too full when the frame is doffed the first time after changing.

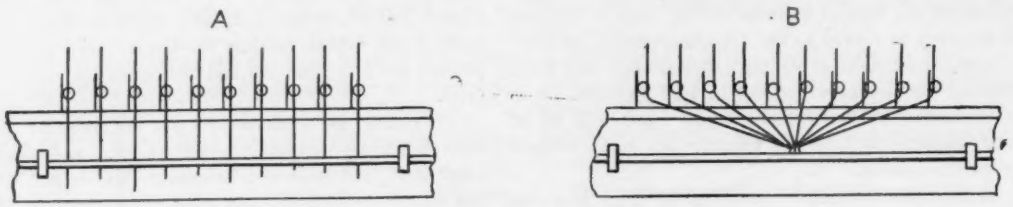

Fig. 6

After the frame has been started the number of teeth the taper gear must move has to be adjusted on those machines that have the receding taper top, Fig. 7, a. This adjustment is usually a matter of experiment, but once the proper teeth have been ascertained for any particular count, a record of them must be kept. For this purpose, a table of teeth placed at a convenient point is probably as good a stunt as any yet devised.

The degree or amount of taper should be definitely decided on, and this standard will then determine the number of teeth required. Much waste has, and will be, the result of too short a taper (Fig. 7 b), a condition that results in the yarn shelling over the top, as in Fig. 7c.

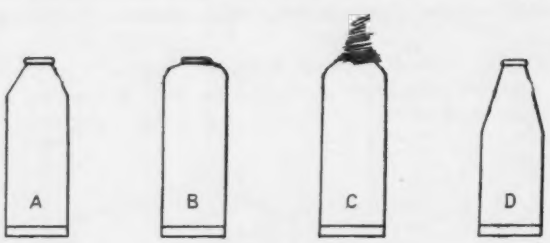

Fig 7

On the other hand, too sharp a taper (Fig. 7 d) will result in too frequent doffing because of the smaller quantity that can be put on such a long-tapered bobbin.

In that type of machine where the traverse runs the full length of the bobbin barrel, there is, of course, no adjusting to be done for taper, this having been made a permanent feature by reason of the shape of the cam.

Where very great variations in counts occurs, it is often necessary to change the lay gears in order that the yarn be wound on the bobbin without overriding on the one hand, or forming hollows on the other. For the sake of obviating unnecessary experiments and the waste incidental thereto, a table of lay gears should be made up.

Too large a lay gear results in the open coils shown in Fig. 8 a; whereas too small a gear will make the coils override as in Fig. 8 b.

The proper coiling naturally being that disposition wherein the coils are in juxtaposition to one another, it is well to keep tabs on the coils per inch for the different counts and lay gears.

Who changes the twist and other gears? Either the second-hand or section-hand. Only one of them, however, should have this duty assigned to him, and he must be held responsible for the proper gearing. Where both are permitted to change gears and neither made absolutely liable, there will be confusion resulting in wrong gears—and consequently, wrong drafts and twists. And most likely each man trying to lay the blame at the other's door.

Obviously, if there are any safety locks on the machines they should be used when the gears are being changed. In some mills that the writer has visited, the safety locks were in fine condition—but never used. Such a defiance of safety regulations, like the 100th trip of the pitcher to the well, may sometimes prove serious for the person changing the gears. But regrets, it may be safely said, have never yet brought back finger joints.

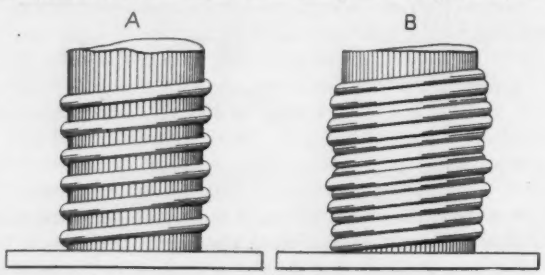

Fig. 8

After a frame has been changed, it is essential that the twist be ascertained as a check on the twist gear put on. In every case, it is advisable to test ten bobbins. Ten bobbins are here given, for the reason that they will be fairly representative of the frame as a whole, and, therefore, there is less danger of an error than there would be if only one or two were tested. Moreover, the average is easily ascertained by simply moving the decimal point of the aggregate one place to the left. Below is shown how the results of such a test should be tabulated:

Bobbin Number	Twist Turns per Inch
1	19.1
2	19.4
3	19.7
4	19.3
5	19.2
6	19.3
7	19.7
8	19.0
9	19.5
10	19.4
Average	19.36

Either the second-hand or the overseer should test the twist on every frame changed. Many a pound of waste will be thus avoided through an oversight in the proper gear put on.

Twisters are apt to have gearing mistakes happen when the jack-gears have to be changed as well as the twist-gear. Testing of the twist immediately upon starting the frame will instantly disclose the error every time.

Errors in numbering twist-gears, while rare, do sometimes happen; spindle whirls wear down in time; bottom rolls will wear; cylinders will wear—all these things tend to change the twist from that obtained from the twist constant.

Taking up the matter of wrong number on gears, let it be presumed that the twist gear for a certain count is 20 and the twist 20. The practical working twist constant, accordingly, is 400. Now, if a twist of 16 is to be inserted, the twist gear will be 25. Suppose, now, that the gear were marked 25 by mistake, there being actually only 24 teeth; obviously, the twist will be 16.67 turns. Now, even if this extra twist were not objectionable, there is the loss in production and the higher cost of the work turned off by the machine to consider. In the case under consideration, a gear of one tooth less than the required 25 would reduce the front roll speed, and consequently, the production, by 1-25, or 4 per cent.

Worn spindle whirls bring about an increase in twist without the reduction in production. This is so because the smaller whirl increases the ratio of the spindle revolutions to the cylinder revolutions.

To illustrate: assume that the whirl is 1⅛ inch, and that the actual spindle speed is 7,000 rpm. Take now the case of the whirls having worn down to about 1⅛ inch.

By proportion—1.0625 : 1.125 = 7,000 : higher speed, or, 7,411, which is an increase of 411 rpm.

What to do in such a case? Caliper the spindle whirls and put all those of the smallest size together, then change the twist to one tooth more. The reason for calipering the whirls is that they do not wear evenly, quite some variation being found in going over them.

Bottom rolls, particularly brass ones—like everything else—are bound to wear, and when this wear is augmented by the dragging of a top roll whose pins have worn hollows into the capbars or are themselves worn unevenly, there is danger of a considerable variation in twist. Sometimes to the extent of making it imperative to put in a new roll! Turning down the rolls can be resorted to, but it means a change in the twist gear. And where twisters of the same counts, the same size rings, and spindle whirls, require different twist gears, there is always a possibility of a slip in putting on the twist gears.

Consider now the variation in twist due to the difference in the size of the rolls. Granting an actual spindle speed of 7,000, and a roll speed of 40. Also calculating the twist inserted from the spindle speed and the delivery of the roll when new, or 1½ inches. Putting the proposition as a formula we have:

$$\frac{\text{spindle speed}}{(3.1416 \times \underset{\text{cir. of roll in inches}}{1.5}) \times \underset{\text{speed of roll}}{40}} = \frac{7{,}000}{(3.1416 \times 1.5) \times 40} = 37.14 \text{ turns per inch.}$$

If the roll has worn in spots to 1.45 inches, the formula will be: $\frac{7{,}000}{3.1416 \times 1.45 \times 40} = 38.42$ turns per inch, or an increase in twist of 3.44 per cent.

Moreover, the production of the worn parts will be correspondingly lower.

From the foregoing items it will have become apparent that it is very necessary to test the twist when changing a frame. Furthermore, the advantage in taking a test of 10 bobbins will be realized when it is remembered that individual variations will occur despite the fact that cylinders, rolls and spindle whirls may be new and of proper dimensions.

For example, where an average of 10 bobbins indicates a twist of 30 turns per inch there may be one bobbin which only went to 27.5 turns, whereas another bobbin may have gone as high as 32.5 turns.

Mills which have a large variety of counts running at one time, and whose productions on the several numbers are subject to radical changes, whose machinery is a conglomerate of all sizes and styles, will do well to keep a record of particulars appertaining to the changing of counts.

A guide to such a collaboration is given herewith for a spinning frame:

COUNTS.....

MAKE OF MACHINE..... NO. OF MACHINES.....

SIZE OF RINGS.....

Cotton grade and staple .....
Single or double roving in creel .....
Hank roving in creel .....
Size yarn spun .....
Draft .....
Draft gear .....
Twist .....
Twist gear .....
Teeth in ring-rail traverse gear .....
Revolutions of front roller .....
Size of front roller .....
Revolution of cylinder .....
Size of cylinder .....
Revolution of spindles .....
Size of spindle whirls .....
Sides per spinner .....

Other facts that it may be desirable to retain can be annotated, also any remarks as to the running property of the work or the cost of the same. Such a record will save much time and obviate much confusion when a number, having been discontinued for some time, has to be spun again.

[This is the third and concluding article of this series.]

The latest edition of the textile catalog of the C. J. Tagliabue Mfg. Co., 18 to 88 Thirty-third Street, Brooklyn, N. Y., has just been issued. The booklet is attractive, containing 36 pages of information, and the front and back covers consist of illustrations showing applications of "Tag" automatic controllers to textile machinery. Detailed explanation of the manner of operation of this equipment is given in the booklet. Recording and temperature controlling equipment for dyeing machines, and size making equipment, and other textile machinery are illustrated and described. Copies will be sent to those interested.

Processes for Finishing Cotton Ducks

BY WILLIAM B. NANSON

Bleaching.

Another distinct advantage of the use of chloride of magnesium is that it tends largely to prevent the formation of oxycellulose. Oxycellulose is formed when cellulose is acted upon by an oxidizing agent such as an alkaline hypochlorite in the presence of oxygen, and not only does it cause tenderness of the fabric by the destruction of the fiber, but by subsequent further oxidation it often gives rise to the discoloration of otherwise white fabrics, since it gradually turns yellow in the course of time. When oxycellulose manifests itself in yellow and brown blotches and streaks in the finished goods it is usually the result of air in the kier in the lime or caustic boil; but when the goods turn yellow or brownish all over, either in the storeroom or during any process of steaming or vulcanizing, the goods have been either insufficiently boiled or too strongly chemicked; in most cases the latter, owing largely to the inadequacy of the boil demanding a strong chemic for a longer length of time to get the cloth white.

For these same reasons we also use acetic acid in the bleach—it prevents the formation of hydrate (oxide) of lime on the fiber, and is thus a preventive of the formation of oxycellulose. Acetic acid in the presence of chloride of lime yields free hypochlorous acid and acetate of lime. During the process of bleaching the hypochlorous acid reacts on the chloride of lime, yielding chloride of calcium; the acetic acid is again liberated and the reaction is renewed a second time and so on, *ad infinitum*.

The hydrochloric acid which is formed in the process of bleaching never remains in a free state, because it reacts on the acetate of lime, liberating acetic acid. This fact is of great importance, because hydrochloric acid reacts in an injurious manner on the fiber if it remains in contact with it for too long a time, while it is known that acetic acid is quite harmless. As there is no formation of insoluble salts of lime, the usual souring following the chemicking may be easily dispensed with. Under these circumstances, outside of the economy, the danger of leaving traces of a mineral acid on the fiber through inadequate washing is averted, and this danger is especially to be feared in the case of heavy goods such as ducks.

The cost of the acetic acid is inappreciable, because such small quantities are used on account of its constant regeneration during the bleaching process, as we have already demonstrated.

Bleaching Duck for Canvas Shoes.

If these goods are for the regular variety of white canvas shoe and do not have to be vulcanized, they may be bleached by either of the methods given for scouring and then chemicked white or they may be bleached as follows: Steep, preferably in diastafor, caustic boil, chemic at ¾ degree Tw., sour at two degrees sulphuric acid, wash thoroughly into kier, ash boil, chemic and sour, soap on machine, give light chemic with chloride of lime and chloride of magnesium and acetic acid at ½ degree Tw., mangle onto rolls through hot water, and do not sour or wash after this last light chemic.

Owing to certain conditions of handling and manufacturing, shoes made from this bleached canvas are liable to turn pink after being made up and stored while sometimes the goods age up into yellow or brownish discolorations. The pinking may arise from one of two causes: first, a mildew known as the pink Torula, and secondly, the formation of pseudo mauveine from the fumes of nitro benzene and aniline which are contained in the various cements used in a shoe factory. In either case it requires an acid condition of the goods to develop the pink coloration, and as it is almost impossible to wash all the acid out of the goods after white souring, it is advisable to chemic the goods as described and not sour them afterward, or, if the goods are to be soured, neutralize them by running them through ammonia and warm water in the mangle. Some bleachers use borax and some soda to accomplish this; borax answers fairly well, but there is always the danger of overdoing it and these alkalis remaining in the goods will, sooner or later, cause the goods to turn yellow or brown, according to the quantity of alkali left in them. Ammonia, being a gas, will combine with any free acid there may be in the goods and neutralize it, and the uncombined ammonia gas will be driven out when the goods are dried. Perhaps acetate of soda might answer to safely neutralize the goods, and I would suggest that some bleacher experiment along this line.

If the goods are to be blued in the finishing, use an alkali blue. A Prussian blue—or rather the iron in it—may under favorable conditions combine with the nitro benzene fumes in the air and cause a pink coloration of roseaniline.

Now, when the bleached duck is to be made into canvas shoes that have to go through a vulcanizing process, the bleaching must be very thorough and without the use of strong oxidizing materials such as chloride lime, as we must avoid the formation of oxycellulose or the duck will turn yellow when vulcanized. The chloride of lime used must be very weak, and the bulk of the bleaching must be accomplished by the boiling, etc. These goods must be so bleached that they will stand a steaming at 266 degrees F. with no appreciable change in color. The goods should be bleached as follows, and *no quick process will answer*:

(1) Steep overnight, preferably in diastafor.
(2) Wash and boil eight hours, caustic soda 2 degrees Tw.
(3) Wash and sour two hours, sulphuric acid 2 degrees Tw.
(4) Wash and boil eight hours, soda ash 60 per cent, caustic 40 per cent, 1½ degrees Tw.
(5) Wash and sour two hours, sulphuric acid 1½ degrees Tw.
(6) Wash and boil eight hours, soda ash 1½ degrees Tw.
(7) Wash and chemic 2½ hours, chloride of lime ½ degree Tw.
(8) Wash and sour two hours, sulphuric acid 1 degree Tw.
(9) Wash well twice.
(10) Mangle through ammonia solution and test continuously for acid. If there is the slightest trace of acid, the goods will turn brown and be made tender when vulcanized. Neither must soda or borax or any fixed alkali be used or the goods will turn yellow or brown when vulcan-

ized. Ammonia alone will answer. No blueing is used on goods for vulcanizing, no blue could stand it.

Starching and Finishing Dyed Ducks.

Dyed cotton ducks, especially if they are intended for the clothing trade, must be finished up to their grey weight, that is, a standard 7, 8 or 10-ounce duck, must weigh 7, 8 or 10 ounces per yard when finished. Usually, in the process of dyeing, a cotton duck will lose in weight per yard about what it will lose in width, and this loss in weight must be made up in the starching and finishing.

Again, it is necessary to so starch the goods that they will not break down and become soft and sleazy during the various handlings of cutting, sewing and so forth, which they must endure during the process of manufacture into clothing, and, moreover, this starching must be so constituted that it will assist rather than resist the easy cutting and sewing of the cloth.

When making starch for dyed ducks a starch must be selected which will give the most transparent size and one that will have no action on colors. Taking everything into consideration, price, etc., corn and sago starches give the best results. These form a colorless transparent mucilage that hides the color much less than flour; potato starch is all right but will not stand thin boiling and, moreover, it is too expensive.

Corn starch is used chiefly in medium and heavily sized goods in conjunction with sago flour. The proposition generally employed is three parts corn starch to one part sago flour, though for ducks they will work in almost any proportion. Corn starch itself requires thorough boiling in order to insure the proper breaking up and gelantinization of the starch granules, and unless this boiling is prolonged the size will produce a rough feel on the goods.

Before boiling corn starch add one pound of dry caustic soda dissolved in water for each 100 pounds of starch used in the mixing. This caustic must be added as follows: run two-thirds of the water into the starch, then start the agitator and dissolve the starch into a milk; when the lumps are all dissolved(or broken up) add the caustic slowly, dissolved in a large quantity of water, stirring well all the time; when the caustic is all added turn on the steam and boil one hour. After the starch is boiled the softening and weighting materials may be added and the agitator started until all is dissolved into a clear homogenous paste. The caustic soda produces a smoother feel and it renders the starch much more adhesive, and in conjunction with the one-hour boil, the starch boils thin and penetrates the goods better and does not show on the surface of the cloth. While speaking of corn starch I might say that corn starch is more disposed to mildew than other starches.

Sago Flour.

Sago starch makes a thinner paste than any of the other starches used in finishing. It makes a strong size and is therefore used principally for heavily picked, closely woven goods, such as ducks, on account of its great stiffening power in conjunction with its thinness and consequent extra penetrating power. Sago has a greater tendency to add strength and body to ducks than any other starch, and, unlike corn or any of the other starches, the stiffening is permanent. Cloth sized with sago flour will retain its strength and stiffness for months and withstand the wear and tear of cutting up and sewing far better than corn starch will.

When sago flour is to be used for heavy ducks where a large percentage of size is required to be put in the goods, it must be boiled from two to four hours with caustic soda, a very much heavier size can be used in this way than by the old way of boiling size, because, while the heavy size is there, it boils thin and penetrates to the center of the goods. The amount of caustic soda to use for each 100 pounds of sago is from ¼ to ½ pound of the solid alkali. The alkali should be dissolved in the water used for making the size and the sago afterwards mixed with it.

Weighting materials, to increase the weight, can be used, but are not advisable. The mineral salts are much used for this purpose, such as sulphate of soda, sulphate of magnesia, chloride of magnesium, chloride of zinc, or even common salt. These three latter derive their value as a weighting agent from their power to absorb water; being very deliquescent, it is the water they contain which gives the weight and they not only present the danger of inducing mildew, but the free acids they contain cause all buckles or buttons, or other metallic parts of the garments made from them to tarnish and become discolored.

On the other hand, the sulphates of magnesia or soda, while not hygroscopic, contain considerable water of crystallization, and these crystals impair the cutting edges of the knives used by the cutters as well as heat up the needles of the sewing machines. Glucose is probably the best thing to use as a material to give weight; it does no harm, if used in reason, and a thick, full feel can be obtained with its help. It has, however, a tendency to break down and go soft as well as to induce mildew, and is, therefore, unsuitable for finishing ducks for leggings or other goods requiring a permanent stiffness.

When stiffening dyed ducks for leggings, the peculiar action of caustic soda upon starch granules is taken advantage of, the mode of procedure is something like this:

Mix together in a suitable vessel 100 pounds of corn starch and 40 gallons of water, start the agitator and run until all lumps are dissolved, then add *gradually*, with constant stirring, 23 pounds of caustic soda solution at 66 degrees Tw., dissolved in 24 gallons of water. After thoroughly mixing, the mixture should be allowed to stand for about two hours, and then, with constant agitation, add 56 pounds of sulphuric acid at about 25 degrees Tw. After standing, the mixture must be tested for acid or alkali by means of litmus paper. The greatest care must be exercised in seeing that no free sulphuric acid is left in the mixture. In the proportions given, an excess of alkali will be present in the completed result which will do no harm, but this excess of alkali may be neutralized if so desired by acetic acid, and any slight excess of this will be removed when the mixture is boiled, as it must be. The proportion of water given may be varied according to the requirements of the finishcr.

The result of this mixture is called *apparantine* and it may be also prepared by boiling corn starch with caustic soda and water and afterwards neutralizing, or nearly neutralizing, the alkali with sulphuric acid. Prepared in this way it requires less caustic soda and consequently less sulphuric acid, in order to produce results equal to thoes obtained by the cold process, but the writer prefers the cold way of mixing, as given above, and then boil the mixture up before using. This way of mixing does not require the long boiling that untreated starch does.

When finishing, either dyed or bleached ducks, it is

always better to dry the goods before starching. The goods should be plaited down from the dryer into a suitable truck, a whole bale in a truck. When these trucks are taken to the starch mangle they may be sewed end to end and the starching carried on continuously without any stoppage. When mangling ducks, either when starching or watermangling, the goods (a whole bale at a time) must be run onto rolls by means of two batching drums at the back of the mangle. See Figure 1, in which we have left out the mangle frame and show only the rolls and batching drums A A, and the course of the cloth.

When starching dyed ducks for extra stiff finish such as leggings, telescope duck, etc., we may proceed somewhat as follows: Into a tub holding 300 gallons and fitted with

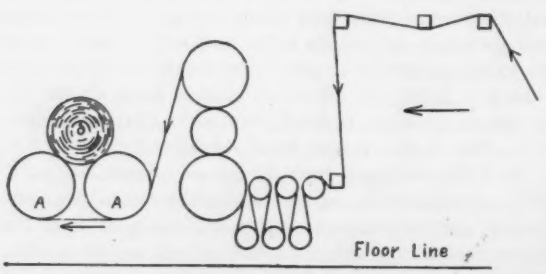

Fig. 1.

an agitator we put 150 pounds of corn starch and 150 pounds of sago flour and about 200 gallons of water, then add by slow degrees 100 pounds of caustic soda at 66 degrees Tw., previously mixed with 50 gallons of water, stir continuously and let stand for two hours altogether, then neutralize the alkali with sulphuric acid at 15 degrees Tw. Keep the agitator going until almost neutralized, taking special care to leave the mixing slightly *alkaline;* this is important—that the starch be alkaline—if acid the goods will tender when dried. Then boil for 20 minutes; after boiling add whatever softener (20 to 30 pounds of castor oil soap) may be required or weighting material (glucose); this to make cutting or sewing easy, softeners or weighting materials are not necessary for telescope ducks. I might say that the dyeing color—where substantive aniline colors are used—may be also added to this starch mixing and the dyeing and starching carried on by the one operation, in this case the dyebox must be heated by a steam coil, not an open steam pipe. The goods must also be run twice as described under the head of dyeing. The foregoing materials may be varied to give any degree of stiffness or weight. With this style of starching the size may be kept boiling in the dyebox all the time; for this reason it is quite suitable for both dyeing and starching to be carried on at the same time, provided all steam condensation is kept out.

Where a very stiff finish is required, glue may be added to the size; it must be soaked in water overnight to get the acid out of it, then run the water off and melt and add to the starch after it is boiled and stir in well. Glue will not stand boiling, so it must be melted in a warm (water bath) not hot place, and added to the starch after it is boiled.

Hunting coats and all goods intended for clothing, overalls, etc., should be starched with a mixture that will give a full mellow feel to the goods, and I would suggest 300 gallons of water, 200 pounds corn starch and 20 pounds of soluble oil, glucose to weight (if needed); boil well.

Bleached duck for coats, etc.: Corn starch, 10 parts; Epsom salts (saturated solution, 32 degrees Tw.) glue, two parts; water, 144 parts; heat to 160 degrees F.

This last process will make a well closed, dull, clothy, mellow finish. The humidity retained by the Epsom salts will overcome any tendency to excessive stiffness. Epsom salts has the peculiarity that it swells when it dries, in this way it enters into the fibers of the cotton, and by swelling up when dried, enlarges them and makes the goods feel full and thick. Never use Epsom salts on colored goods unless neutralized. This latter mixing will finish very smooth and full if heavily calendered, but the best finish for a duck is just a "conroy" finish, that is, just no finish at all, but just run twice through the damping frame or sprinkler. A heavy weighting finish can be put on a bleached duck by using the following mixings:

224 pounds corn starch
20 pounds glucose
10 pounds soluble oil
300 gallons water, in which has been dissolved two pounds of caustic soda.

This mixture will add ten per cent to the weight of the

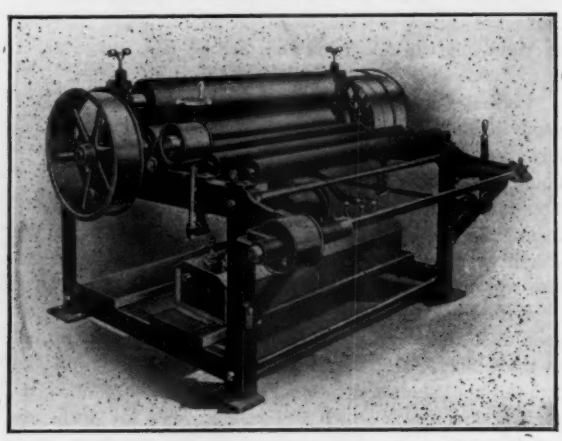

Fig. 2.

goods if conditioned right on the sprinkler or damping frame.

For 300 gallons of starch for bleached goods use:

224 pounds corn starch.
50 pounds sago flour
50 pounds glucose
224 pounds China clay (well boiled previously)
20 pounds soluble oil
10 gallons magnesium chloride at 56 degrees Tw.
4 gallons zinc chloride at 100 degrees Tw.
300 gallons water in which has been previously dissolved two pounds of caustic soda.

This will add 30 per cent to the weight of the finished goods, or the finisher can go beyond or under these two extremes.

It is quite obvious that the amount of moisture in the goods must affect both the general finish and the actual weight of the goods. We know that ordinary starch can be made to contain 18 per cent of water without it becoming really noticeable, and 25 per cent can easily be attained without working any harm; it is therefore quite obvious that if an eight-ounce dyed duck comes off the drying machine from the dyehouse weighing only 7½ ounces to the

yard, starch and water alone can be added to it to make it up to eight ounces without adding any outside weighting materials of any kind.

If the goods are finished too dry, they are not only light in weight, but the finish "breaks down" and becomes soft and sleazy. On the other hand, an excess of moisture destroys the capacity of the cloth to stand up and feel full and lofty, but the material may be so conditioned as to gain both elasticity and weight if the amount of moisture imparted to it by the conditioning machine (sprinkler) is carefully and skilfully applied.

Many finishers prefer to condition their goods at the drying machine, claiming that the cloth, when once dried up, has lost something of its nature, which cannot be recovered by artificial damping subsequently, and, moreover, that the artificial damping is too superficial in its action. There may be something in this claim—it sounds plausible enough—but the carrying of it out in actual practice is too uncontrollable and uncertain in its results to be practically feasible. The safest and most reliable plan is to dry up the goods completely, and after they have cooled off, to apply to them a definite quantity of water by means of a spray, as in an atomizing sprinkling machine (Figure 2), by this means the amount of moisture present and applied is thereby controlled in a definite manner.

The effect of damping is to raise or swell the threads; it will be seen, therefore, that "condition" or degree of moisture left in the cloth has an important effect upon its subsequent feel, to say nothing about its weight, as also has the temperature of the cloth which should always be cooled off after drying before the final finishing process.

A moderate degree of moisture without heat is conclusive to a soft, mellow finish, but the same amount in cloth that has not yet cooled down would cause a harder finish. Considering the question of condition apart from temperature, a slight condition is favorable to a soft finish, but if the amount of water be excessive and the cloth "drowned" the finish is spoiled.

Heavily starched, either dyed or bleached ducks, are capable of absorbing a great volume of water without their becoming apparently wet to either sight or feel, provided the conditioning is practiced right; to do this, heavy goods should always be sprinkled twice with an interval of rest between. It takes so much water that if it is applied at once running, the water will splash and make wet places in the cloth.

When ducks are to be finished very stiff, for stiffening waist bands and similar cloths, colored and white, and also sometimes for leggings, they should also be run twice in the starch as follows: First passage: 1½ pounds sago flour is mixed with each gallon of water and boiled from 1 to 1½ hours. The cloth is starched in this and thoroughly dried. Second passage: to every 150 gallons of the foregoing add Epsom salts, 112 pounds, and 20 pounds of tallow. This mixing should make an abnormally stiff, thick feeling piece of cloth and should add about 33 per cent to the weight. If colored goods are to be starched with this mixture, care must be taken that the mixture is slightly alkaline, if not, make it so by the addition of a little soda ash.

(This is the fourth of a series of articles on this subject by Mr. Nanson. The next will appear in an early issue.—Editor.)

INTANGIBLES IN MANUFACTURING

A Series by

Frederick H. McDonald.

The Manufacturer as a Selling Liability.

Contrary to a general impression, and the attitude of some producers, the readiness with which an article can be sold is not entirely a problem of salesmanship.

There is no divorce court in the land that can separate salesmanship from the field of manufacture—and leave either of them happy.

When a given product is chosen to be manufactured, a given process of manufacture decided upon, and the finished article put up in a given way, the use to which it can be put, the service to be derived from it, and the attraction it has to the prospective purchaser are all definite resultants.

The ease with which it can be sold, or the difficulty in selling it, are as fixed as are the characteristics of the article.

The manufacturer, therefore, who blindly selects his product without due regard to its possible field of utility; who does not process it in a manner to insure the possession of desirable qualities; and who finishes and packs it in any old way, has a nut to crack that is beyond the powers of the best salesmanship—it will take all the red rouge of advertisement, the permanent-wave of oratory, and the bijouterie of cut-prices to get even a smile of flirtation from the prospective buyer.

And if it passes muster so much as once in each place—it will scarce repeat.

By a little careful study and intelligent insight, a little research and consultation, any or all of these factors can be improved in existing products, or made favorable in new ones—

With an improvement in the ease of selling, the consequent quantities sold, and the resultant profit.

For the purpose of rendering a still more efficient and complete service to the southern textile industry, the H. W. Butterworth & Sons Company of Philadelphia, manufacturers of textile finishing machinery, have established a branch office at 900 Woodside Building, Greenville, S. C., which is in charge of J. Ebert Butterworth, treasurer of the company. Mr. Butterworth will be assisted by J. Hill Zahn, who also has been identified with the organization for a number of years. The establishment of this branch is in recognition of the remarkable and rapid development of the southern industry, it is stated, and service will be rendered direct from this headquarters, where complete plans of practically every Butterworth finishing machine ever installed in the South are kept.

Human Relationships in Industry

BY W. M. McLAURINE

In this and the following articles of this series the writer wants to give full credit to the Federal Board for Vocational Education, both state and national, because it was in their service that much of this work was done. His hearty reception by the superintendents and overseers of many of the cotton mills of Georgia furnished the meeting place for experimentation and many if not all of the ideas embodied are but a systematic and analytic arrangement of the ideas that these men advanced. My confreres, J. F. Cannon, state supervisor of industrial education of Georgia; W. J. Rountree, head of the department of industrial education at the Georgia School of Technology; T. H. Quigley, regional agent for Federal Board of Vocational Education, and the students of Georgia Tech all have discussed these problems, and it is the writer's wish that those who read keep these things in mind. As Montaigne said in presenting a bouquet of flowers to one of his admiring ladies, "I did not grow the flowers; I simply plucked and arranged them and bound them with a ribbon."

There are many angles at which to enter the subject of "Human Relationships," or foremanship training, but the writer shall advance as he has in conducting conferences. Inasmuch as much of the work done was done in some of the larger mills and these mills were located in cities or where there were other groups of mills, "Labor Turnover" is a topic that is usually used as an introductory conference. It will be the writer's point of view to give suggestions, and the individual mill can adopt them to its own use. The method of procedure will be: the problem; the cause; the cost, and the suggestion for a remedy.

After the group has been assembled and preliminary remarks have been made in such a way as to make all feel free and easy—all stiffness and all formality gone—the writer would suggest that the leader then proceed to ask each member of the group four questions. These questions are asked each member around the class and their answers are recorded on a board or by a secretary or mentally. It is better to have a blackboard and write them where each one can see them. The questions are: Did you ever lose your job? Why? Did you ever just quit? Why? Since being an overseer or superintendent, did you ever have to discharge an employee? Why? Did you ever have any one to just quit? Why?

In a group of eight to fifteen men, if the answers are on the square and honest, you will have a very typical group of answers or reasons as to why there is labor turnover. The writer submits below a revision of some of the suggested reasons given by Gordon S. Watkins in his Analysis of Labor Turnover in June, 1921, issue of Administration. It must be understood that as these causes are developed by the group, they must be taken and after they have all come out, as far as the group thinks they are capable, then all effort is made to classify them.

At first causes were developed from the group and tabulated regardless of any order or grouping. After all causes had been developed then they were discussed to find out if they could be grouped under large headings, if so, what they are. Below is a result of the final analysis:

I. Personal Causes:
  1. Physiological
    a Death
    b Physical defects
    c Health
    d Temperament, nerves, etc.
  2. Psychic
    a Bouyant
    b Restless
    c Despondent
    d Love of excitement
    e Regular employment monotonous
  3. Economic
    a Desire for more money
    b Local living conditions

II. Industrial Causes:
  1. Deficiencies in industrial administration.
    a Inefficient employment policies
    b Lack of proper incentives
    c Autocratic superintendence
    d Personal prejudice and favoritism
    e Incomplete working force
    f Unfair discharge
    g Taking no interest in men but labor interest
    h Misunderstandings
    i Insubordination
    j Incompetency
    k No transfer to other department
  2. Undesirable labor standards.
    a Grade and class of help employed
    b Undesirable conditions for employment
      a Poor machines
      b Bad work and supervision
      c Accident hazards too great
      d Bad ventilation
      e Bad sanitation

III. Social Causes:
  1. Lives too far from work
  2. No transportation facilities
  3. Bad living conditions in village
  4. Inadequate housing conditions
  5. Absence of parks, schools, and recreation centers

If the group is a little slow getting off and perhaps slow in talking, below is listed a group of questions which were developed in a meeting. A discussion will likely follow some of these questions. Members of the group may inject questions which will be worth discussing. It must be kept in mind that all discussions must be free from personalities, and constructive. The questions follow:

1. One man in a cotton mill came to the overseer and told him that he was going to quit to take a similar job at the same pay in another mill. What was the matter?
2. A foreman bawled out a new operative when this operative made a mistake during his first week at the mill. The operative quit. What was the trouble?
3. A girl in one department was doing fairly good work but she had more experience in another department.

Did you ever stop to figure the cost of labor turnover? It makes a rather constant drain on the amounts you could and should set aside for profits. Let us go into this question carefully, following Mr. McLaurine's suggestions and then watch the results. Will you?

She asked to be transferred to this department. She waited until several opportunities for transfer had passed. Then she quit. Who was to blame?

4. In a department several accidents occurred during a certain month. The help grew restless and several quit. What was the trouble?
5. A family in a mill community moved because of trouble with neighbors. Was this necessary?
6. A foreman bawled out a man because he was turning out his work slowly, the man quit. Later this foreman found out that family troubles had been worrying this man, sickness, late hours, and general fatigue. Was this good leadership?
7. A certain overseer has trouble keeping help; he always passes the blame on to someone else. Is this good policy?
8. A certain overseer never takes suggestions from his help. He tells them they are to work and not suggest. Is he likely to have trouble?
9. Can you do good work for a man you are afraid of? Will you stay with him if you get a chance to leave?
10. What types of men have the greatest trouble with their help?
11. Should help have any consideration shown them concerning sanitation, lighting, heat, etc.? What?
12. If a man does a good job or something extra in addition to his job should the foreman let the man know that he noticed it? Why?
13. Which man is easiest to deal with: A man who can think or one who can not?
14. Do churches, schools, recreation centers help in the control of labor turnover? How?
15. Among what class of help do you have the greatest turnover? Why?

These questions are only suggestive, as a real live man can frame his own perhaps to a better advantage. After all has been said, the point of view of the conference thus far has been to try to determine the causes of labor turnover. It is necessary to show that it simply does not "just happen"; there are causes and these causes can be found.

The second step in the process of development is, does it cost anything to have labor turnover? If so, who pays and in what way? In no sense should this be attempted as a cost accountancy problem but as suggested below, and these were developed with a group of answers.

COST OF LABOR TURNOVER.

1. The clerical cost incident to hiring and firing.
2. The cost to foreman in instructing new help.
3. Increased breakage, wear and tear of machinery.
4. Reduction of production.
5. Increased quantity of spoiled work.
6. Unrest in remaining employees.
7. Kills cooperation.
8. Gives the mill a bad name.
9. Gives the department a bad name.
10. Estimated money cost, $3.00 to $73.00 per man.

Examples:		
	Hiring and clerical	$ .75
	Advertising	.50
	Instruction	5.50
	Wear and tear of machinery	12.00
	Loss of production	25.50
	Spoiled work	12.00
	Accident	3.00
	Interest	.50
		$59.75

If there is a problem, and these are reasons for this problem and indifference is a cost, then there naturally follows a business question: How can we solve the problem? Remove the causes.

In checking causes it should be noted that discussion should be centered on only those causes that lie within the realm of the group to remedy. For example, most overseers employ their own people either directly or indirectly, hence "The Hiring Policy" is a subject that rightfully comes within the realm. "Attitude of the Superintendent or Overseer," "Lack of Proper Incentives," are further examples of causes that can be remedied.

To proceed to the first and, to the writer, one of the most potent problems in causing or curing labor turnover in any industrial organization is found the hiring problem. If this could be solved all other things would care for themselves. If the writer can be pardoned in the introduction of this problem, he would like to use a biblical setting for a secular subject. Back in the early days in the city of Jerusalem was placed the Temple of God. Around this city was placed a wall with gates as entrances there unto. At these gates were placed watchmen who were responsible for those who came in and went out. Only those who were in sympathy and harmony with the established customs of those living within the city, those who desired to worship at the altars erected in or around the temple were wanted and desired. All went well for a while. By and by new philosophies, new doctrines, new faiths, new ideals, idolatry, Baalism sprang up. The old faith was thrown aside and chaos and cataclysmic crisis broke out; the city walls were thrown down; the city was plundered; the Temple of God was destroyed, and a once happy people was made captives and later wanderers on the face of the earth. This figure seems to the writer to be suitable and fit in the introduction of this problem. Some one has said that "He who builds a factory builds a temple, and those who work therein are its worshipers, and as they work so is their worship." Service is the keynote of spirituality. The overseers and superintendents are the watchmen who stand at the gates of this invisible and yet real city of progress, peace and prosperity, or city of indifference, chaos and grafting. As long as they watch carefully those who enter the industrial city to worship in the factory and mix and mingle with its people, as long as only those who have right ideals and attitudes and assimilative cooperative tendencies come in, the city and the factory are safe; but when necessity for some seeming emergency, laxness because of indifference, when the good of the body politic is seemingly lost for the individual, when chances of a foolish and vain kind are taken, our city and our factory will be in peril. The hiring problem is one of great magnitude and not one for a neophyte or an experimenter.

To get back to a material discussion of the subject, the writer will state that there is no rule, questionnaire, formula or science whereby this problem can be solved.

It has been his experience and observation that it should be done with the fewest questions possible, with the greatest dignity and cordiality setting up on the part of the applicant a basis of confidence and belief in the organization. The writer has had many and varied answers to the question, "What is it you want to know about applicants for a job?"

In proceeding with the group, the writer generally applies to one of the group for a position or he selects some member of the group to act in this capacity. Then, in good faith, the interview proceeds and the conference leader makes notes of questions and answers until the employer accepts the applicant. After only three or four questions are asked by the employer, the leader then turns to each member of the group and asks if he wants to ask any further questions or if he thinks the employer overlooked anything. Soon a volley of questions start and in a few minutes perhaps fifty or a hundred questions have been asked. Every one knows that this is too many, so the leader and the group begin to analyze and classify the questions and find that they all work under five heads: (1) What he can do? (2) His industrial experience. (3) Character and habits. (4) Economic status. (5) Industrial attitude.

A few suggestive cases for discussion by members of a group follow:

1. Employed a spinner and she was a splendid operator, but she was always gossiping among the help and causing continual trouble. I had to discharge her. Could this fact have been found out in an interview? How?
2. Employed a man to look after the humidifiers and for a while he did good work. Later on he became restless and dissatisfied and had to be discharged. It was found out that his wife was dissatisfied with village conditions. Could this have been averted by the proper interview in hiring? How?
3. An overseer in a Georgia mill employed a card grinder and for a while he seemed to be an excellent fellow. Later he became irregular and seemed to loaf on his job, was irritable when overseer approached him about his work. Finally his health became so bad that a man had to be employed. Was any fact overlooked in the hiring of this man?
4. A family of man, woman, two boys and two girls made applications to an overseer for jobs in a mill, representing themselves to be efficient in the several jobs for which they applied. After they had been given a promise of jobs and moved into the village only three of them reported for work. An investigation of conditions revealed the fact that the group was not a real family, but a group of people living together in an unlawful manner. Could this have been found out in an interview when the people were hired?
5. Can anything be done to counteract the attitudes and actions of the industrial hobo?
6. A section hand was employed in a certain mill and was found to be a valuable man, especially as far as production was concerned. After being on the job some six months he showed signs of having a wrong attitude towards the management. It became necessary to discharge him and shortly afterwards several of the helpers who had been under him. Could this have been averted? If so, how?
7. Overseer gave employment to a man as sweeper. He was given a house in the mill village. Investigation showed that his family, consisting of wife and three young children, was in want. The wife became seriously ill and it was necessary for the mill to take charge of the family as dependents. Should overseer have avoided such a contingency?
8. An overseer employed a section man in a weave room and found that he soon came late to work. On rainy and bad days he was often absent. This mill had no village. An investigation revealed the fact that this man lived several miles from the mill and had to walk about a mile to a car line. Was there anything overlooked in hiring this man?
9. A man who was working in a mill became irregular and careless on his job. An investigation showed that he had a wife and several dependent children, none of which was able to work. The wife's health was bad and they were not able to live on the income of the man. Was this man an asset or liability to the mill? Was the overseer covering all points when he employed him?
10. A hand in the weave room was all that could be desired as far as his work was concerned, but was disliked by all the help with whom he came in contact. Conditions became so bad it was necessary to discharge him. Could the proper interview have brought out this trouble with the applicant?
11. A young fellow of good appearance applied for a job as cloth room man, stating a line of experience in two of the best mills in the state. He talked intelligently about the job. He was given employment and was found to be very inefficient on the job. Was there anything wrong with the interview?
12. A young man of the same qualifications as the foregoing man represented himself to have, was employed and began work and made good. He was highly satisfactory in every particular, but left because of the class of help employed. Was anything overlooked in the employment policy?
13. A girl in the weave room who did fair work herself was of such a disposition that she hated any of the other girls doing as good or better work than she. Investigation revealed the fact that this was a strong characteristic of this girl and she had had to move several times on account of it. Was the interview lacking?
14. The labor turnover in the picker room is very large. There is a continual stream of people coming and going every week. What may be the trouble?

It may be said that the main objectives of this part of the conference on hiring help are (1) to establish in the minds of the conference group the importance of careful hiring; (2) to show to members of the group some of the characteristic weaknesses generally displayed in the hiring of help; (3) to develop with the group the fact that all of the questions asked in an interview, group under certain headings as has been indicated before.

The second phase of the hiring policy is a discussion of the "peak points." The objectives in this phase are (1)

to further impress upon the minds of the men the value of the "peak points"; (2) to show to the men the value of proper questions; (3) to assist the men in the art of questioning. Questions based upon the following suggestions are advised in order to assist in the development.

1. What he knows and what he can do.
   (a) Find out about his past as regards:
      (1) General education.
      (2) Technical, professional or business education.
      (3) What sections of the country he has lived in.
      (4) His father's vocation.
      (5) Jobs held and duration and duties of each.
   (b) This can be judged by his speech and bearing.
2. His industrial experience.
   (a) May be judged by—
      (1) Scanning references.
      (2) Talking to him about the different jobs that he has held, trying to bring out the following points especially:
         (a) Duration of each job.
         (b) Size of company worked for.
         (c) Section of country worked in.
         (d) If a machine operator—kinds of machines operated and make of each.
         (e) Production.
3. Character or habits.
   (a) Observe the following external evidences of character or lack of character:
      (1) Handshake.
      (2) General appearance.
      (3) Countenance.
      (4) Method of answering questions.
   (b) Do not neglect the following aids:
      (1) References to character and habits.
      (2) Views on current events.
      (3) Aims and ideals.
4. Industrial philosophy of the applicant, i.e., what his job means to him.
   (a) May be judged by finding out his views on the subjects:
      (1) How he regards his employer.
      (2) How he regards the public.
      (3) How he regards his fellow employees.
      (4) Capital and labor in general.
      (5) Whether he thinks the world is growing better or worse.
5. The economic status of the applicant.
   (a) Question him on the following subjects:
      (1) Number of dependents.
         (a) How many wholly dependent.
         (b) How many partially dependent.
      (2) Where dependents live.
      (3) If they live in another town does he intend to bring them on, if given the job?
      (4) Salary expected.
      (5) Salary received in last position.
      (6) Any savings.
      (7) Any investments.
      (8) Any insurance carried.
      (9) Ages of dependents.
      (10) Social status.
      (11) Does the family have any income other than from his efforts?
      (12) Rent that he has been in the habit of paying.
      (13) Whether he has looked into the economic conditions in this city or not, and compared them to those in the town where he has been working.

The third phase of the hiring problem is to impress upon the group the fact that the "hirer" is not the only party to the hiring transaction who has a right to information. The "hiree" also should know something about the company and the environment into which he may possibly come. Up to this point the "hirer" has been getting information which he hopes will satisfy *him* but for complete cooperation to be possible both parties must be satisfied. Below are some suggestions that possibly need revisions and these should be by the individual mill according to its policy or dictation. These are given only to indicate the field of information that may be drawn on in trying to establish mutual confidence and make the "hiree" feel that the organization is in good faith in trying to employ an abiding, stable, contented group of workers.

1. Methods of remuneration:
   1. Day, hour or piece work?
   2. Frequency of pay days?
   3. Does the company operate any kind of profit sharing or bonus plan? If so, what is this plan?
   4. What does the average employee in the same class of work earn per week?
   5. Are any deductions made from wages for:
      (a) Insurance?
      (b) Doctor's bill?
      (c) Any other purpose?
      (d) Fines?
2. Working conditions in the plant:
   1. Hours of work.
   2. Class of employees with whom he will be thrown:
      (a) White?
      (b) American?
      (c) Foreign?
         (1) Natives of what country?
   3. Safety appliances.
   4. Heating arrangements.
   5. Lighting.
      (1) Natural?
      (2) Artificial?
   6. Ventilation.
   7. Sanitary arrangements.
3. Living conditions in the community:
   1. Schools.
   2. Churches.
   3. Libraries.
   4. Housing conditions.
   5. Distance from work.
   6. Facilities for getting to work.
   7. Amusement places.
4. Policy of the company as regards promotion:
   1. Does it fill important internal positions by promotion or does it go outside for men to fill such places?
   2. What promotion does the present job put applicants in line for?
   3. If he takes the job, what is the approximate period in which he may hope to be promoted?
5. Policy of the company as regards training:

1. Does it encourage its employees to learn the next higher job?
2. What facilities does it offer for learning this job?
   (a) Training classes?
      (1) Evening?
      (2) On company's time?
      (3) Correspondence courses?
      (4) Library?
6. What social work is done by the company?
   1. Restaurant or cafeteria?
   2. Clubs?
      (a) Athletic.
      (b) Social.
   3. Visiting nurse?
   4. Old age or sickness insurance?

[This is the first of a series of conference suggestions by Mr. McLaurine. Any requests for additional information may be submitted to this office for attention.—The Editor.]

Methods of Handling Artificial Silk

A Discussion Particularly Stressing the Winding, Copping, Warping, Sizing and Weaving Operations

BY WARREN F. COOPER. *

Artificial Silk, over a period of years, has been manufactured and used in this country and abroad in ever increasing quantities. All branches of the textile industry have become consumers. Cotton manufacturers began to purchase artificial silk many years ago and individuals one after another have used more and more. In this great development each manufacturer has worked out his own devices and methods for the best handling. A great deal of cutting and trying has been done to adapt machinery on hand to become machinery for handling artificial silk. Feeling that now the best methods of handling artificial silk are known, your directors have requested me to make these methods of handling the subject of a paper to be presented before your Association. The ground to be covered is large and my suggestions can not be complete. However, I will try to call your attention to some of the methods of handling and precautions to be observed. These will be taken up under the five operations—Winding, Copping, Warping, Sizing, and Weaving.

Winding.

The first and most important part in winding artificial silk is the laying of skeins on the swifts. It is necessary to determine the inside and outside of a skein. This is done by spreading it across both hands, your fingers pointing away from you, until it is flat both widthway and lengthway. If both inside and outside are tight and flat, you have it right side out, or, in other words, just the way it left the reeling machine. If, however, the inside is loose, and the outside tight, reverse it by turning inside out.

With the inside and outside of a skein determined, the next step is to lay it on the swift and find the end. The skein should be laid on the swift in the same relative position as it was made up on the reel—that is—outside on the reel should be outside on the swift. The skein should lay on the swift spread out evenly widthway as far as the swift will allow, and the swift bands should be equidistant from the swift-axis. Artificial silk is reeled with a cross-wind and is laced with four tie-bands, to one of which the ends are tied.

Remove the tie-bands by cutting them on the edge away from the knot; the tie-band to which the ends are fastened being the last one cut. The end for winding is the one running on the outside of the skein. Cutting them on the edge away from the knot will allow them to be pulled out easily without disturbing the lay of the yarn. Don't break the tie-bands, as this has a tendency to break and split the filaments. Don't straighten skeins by beating on a shaker-pole, as this does not straighten the yarn but damages it. It is very important that the operator be instructed to straighten skeins on the hands as noted above.

The process of winding from the skein to the bobbin is performed on a machine similar to that used for winding natural silk. The machine is of light construction and the speed is regulated to insure maximum production with a minimum amount of stretching or breaking of the yarn; thus producing good work. The shaft of the winding machine should run at about 125 r.p.m., which gives an average thread-speed from the swift of 75 yards per minute.

The spindle or arbor on which the bobbin is placed has on one end a friction-bowl, and on the other end a thumb-screw which is used to hold the bobbin in place against the friction-bowl. This bowl is about one inch in diameter and receives its motion by friction from a wheel about five inches in diameter, fixed to the main shaft of the machine.

Some spindles or arbors are designed with a friction-bowl on each end. In this case the thumb-screw is done away with and is replaced by a friction-bowl carrying an interior or female thread. This bowl holds the bobbin firmly on the spindle just as the thumb-screw does.

This type of drive is very sensitive in its action and is suitable for the winding of artificial silk, where a bobbin wound lightly is required. When anything occurs during the winding to prevent the thread coming freely from the skein, it will hold the bobbin stationary until the operator can straighten the skein; thus preventing the yarn from breaking. The traverse should have porcelain guides that are perfectly smooth and which should be inspected at least three times a year, as they become worn or cut from the constant friction of the yarn. It is essential that the guides be perfectly smooth so as to prevent the filaments from being broken. It is also essential that the skein be placed on the swift with the swift-bands symmetrical, as noted above, thus allowing the yarn to come off freely from the swift.

When yarn breaks during the winding operation and it becomes necessary to tie a knot, the operators should be instructed to tie all flat knots.

The humidity of the room in which winding is being done should be carefully maintained. The ordinary daily

* An address presented as a representative of The Viscose Company before the National Association of Cotton Manufacturers.

fluctuations of humidity have their effect on the strength of the fiber. Dry conditioned air is particularly desired. During unseasonably damp weather, during a hazy, muggy spell, and particularly after mill holidays, it is necessary to heat promptly and thoroughly, and to ventilate the room well.

The weight and size of bobbin used for the winding of artificial silk and the weighting of the swift are of great importance. Bobbins suitable for yarns ranging from 100 denier to 150 denier should not be over three (3) ozs. in weight and should conform to the following dimensions:

Overall	3½ inches
Inside of flanges	2⅞ inches
Diameter of flanges	2½ inches
Diameter of barrel	1½ inches

The weighting for the swift should not be over 6/7 ozs.

Copping or Quilling.

Owing to the stretch and uneven tension caused by the variation of the swift, it is not advisable to run the thread direct from the skein to the cop. To obtain the best results, it is essential to run the thread from a bobbin wound on a winding machine; and then on a quiller to run from the bobbin to the quill or cop.

The type of quills used for quilling artificial silk is the same as is used for quilling natural silk. The quilling machines are equipped with compensators to regulate the tension on the yarn, as it passes from the bobbin to the cop or quill. All points of contact should be smooth, and should revolve, (fiber or wooden wheels being used) thus eliminating the friction that would be caused otherwise. Artificial silk is subjected to a severe strain while being quilled and extreme care should be taken as to the uniformity of tension on each spindle. The spindle must be perfectly true, as any variation has a tendency to bruise or discolor the material where it comes into contact with the builder. Uneven tension or strain upon the yarn will cause it to stretch, thus producing tight or bright picks, sometimes called "shiny" picks in the woven cloth. Knots should be laid on the surface of the quill, not in the traverse, so that, during the process of weaving, the thread will draw freely from the quill. This is essential because any obstruction on the quill during weaving also causes tight and bright picks.

The wind most suitable for artificial silk is the 7-wind which can be produced on a natural silk quiller. The speed of the machine should be regulated so that the spindle runs about 2,400 r.p.m.

The length of cop or quill should be not more than 5½ inches. Using a cop or quill of this length, a 7-wind, and 1¼-inch throw, and building it to ⅞-inch diameter, it would hold approximately 1,365 yards of 150 denier yarn. Regulation of the temperature and humidity of the room should be similar to that used in the winding process.

Warping.

The machine used for the warping of artificial silk is the same type that is used for natural silk. This is known as a "horizontal warper." A "V"-shaped creel should be used. It should be arranged so that all the bobbins, when placed on the pins, will be at the same angle on the leasing-reed. Any deviation from this rule has a tendency to put more friction upon the bobbin, and the thread may then come into contact with the side of the bobbin, and break the filaments. At the commencement of a warp, all the bobbins should be as similar as possible in weight and diameter, so that the tension on all the threads is about equal. Care should be taken by the warper, when creeling, that the material is handled as little as possible; as the unsized yarn at this stage is of such a nature that the filaments easily split and break.

The warp is built up in sections, according to the number required, without handling or interfering with the threads after they have left the spacing-reed. The machine is so arranged that a beam can be placed on the back-side and the warp wound on without the risk of any entanglements. It is essential that the flanges of the beams be smooth and true, and that the beam be set to the exact width of the warp on the machine, in order to keep good sides and thus prevent high and low selvages. In preparing a warp for sizing on this type of machine, it is well to bear in mind that the warp must be placed on the beam as light as possible, preferably a soft beam. On the other hand, if the yarn is sized and is being prepared for the loom, then a hard beam is preferred; and more tension should be applied when beaming.

There are other types of warping or beaming machines used for artificial silk; one such as that now being used for beaming cotton. This machine is used in preference to the horizontal type when a warp is required having a range of 100-1000 ends. A "V"-shaped creel is also used for this machine similar to the one used for the horizontal machine, but it is much longer.

As noted in winding and quilling, a dry atmosphere is essential in warping artificial silk; and is even more important in this operation than in any other, and should, therefore, be very carefully watched. In a moist atmosphere the yarn expands, causing it to sag, and making it impossible to beam uniformly.

Sizing.

The sizing machine is especially designed for and adapted to artificial silk, and is capable of sizing the material according to requirements.

It is not advisable to size more than 1,500 to 2,000 ends at one time. When a warp with more than this number is required, it is advisable to use more beams, and to run them together on the rebeaming or dressing machine. Owing to the "stretch" of artificial silk, and particularly so when in contact with the size, the tension on the back beam, when sizing, should be as light as is consistent with good working. When the warp is sized, there is not the same risk of the material stretching; and good results are obtained by making the weaver's beams hard with press-rollers.

In the process of sizing, the beam should be measured about every 100 yards. If the beam should "measure out," that is prove to be high on one side and low on the other, the attendant should build up the low side to the required height by the insertion of paper. Then the presser-roll is so adjusted as to prevent a recurrence.

The success of artificial silk weaving during the last few years is attributed, to a considerable degree, to sizing. Just as sizing is essential to the successful weaving of single cotton yarn, so is it essential that the filaments of artificial silk be bound together by an adhesive substance to strengthen them during the process of weaving. Arti-

ficial silk, properly sized, can be used in all qualities of cloth.

For machine-sizing the following formulas are those most suitable for artificial silk:

(1) 3½ lbs.—Flexible Starch,
1½ lbs.—Corn Starch.

This mixture is dissolved in 3 gallons of water, after which it is poured into a tank that contains 15 gallons of water. The contents are then boiled and stirred for from 15 to 20 minutes.

Before using this preparation it should be allowed to cool down to a temperature of 80-90 degrees F., and this temperature should be maintained during the process of sizing.

(2) 11 gallons—Water,
5 lbs. —Gelatose,
3 ozs. —Glycerine.

Boil the mixture until scum disappears; which will require about 15 or 20 minutes.

To preserve this preparation add 4 ounces of benzoate of soda to 10 gallons of solution.

This preparation can be used cold during the process of sizing.

Formula for Skein Sizing

60 lbs. —Gelatin,
198 gallons—Water.

Soften the gelatin by allowing it to stand for a few hours, then boil for 15 to 20 minutes; allowing the bath to cool until it is luke-warm before entering the silk. Dip the yarn in the bath, then hydro-extract for from 15 to 20 minutes. The yarn is then ready for the dry-machine, but should be shaken out before drying, to prevent the threads from sticking together.

This formula is preferably used for yarn having additional twist; that is 4 turns extra to the inch.

Sizing formula No. 2 can also be used successfully for skein sizing by omitting the glycerine.

Weaving.

The weaving of artificial silk warps needs rather more care and adjustment than that of either natural silk or cotton warps. The warp must be placed on the beam hard and level, and must be of the same width as the reedspace of the warp. The heddles should be of either round or flat wire. They should not be crowded on the harness-frame, as this would result in chaffing and splitting of the yarn; thus producing streaks in the woven cloth. There should not be more than 30 heddles per inch of 30 to 32 gauge wire placed on a frame. Care should be taken that the heddles are as smooth as possible, and without shoulders; any projection interferes with shedding and causes breakage in the material—hence floats, felters and other imperfections.

In weaving warps made of 75 denier, 100 denier and 150 denier artificial silk, the gauge wire suitable for these sizes of yarn would be:

75 denier .....No. 30 gauge wire,
100 denier .....No. 30 gauge wire,
150 denier .....No. 32 gauge wire.

Attention must be given to the reed; the ordinary strong wire is unsuitable, and is very detrimental to the weaving, owing to friction on the material. The reed most suitable is the flexible reed, made of fine wire with rounded ends. This prevents strain and jagging of the filaments, and helps the material to weave better. All reeds should be at least 3½ inches deep from back to back, and should be set sufficiently deep in race-plate on the loom to allow the yarn to pass through the most flexible part of the reed. This allows knots to pass through and prevents threads from becoming stretched, which, if not prevented, would result in shiny streaks in the woven fabric.

The shuttle-race requires special attention as it must be perfectly smooth, or better still, covered with felt or swansdown to form a cushion for the bottom shed. This enables the shuttle to pass freely over the threads without bruising, splitting, or weakening them; and also helps to keep the shuttle down.

It is more practical in artificial silk weaving to move the warp-support closer to the loom, to maintain the shed short, in order that the warp may work more quietly; that is, to prevent a very strong lifting up or down as in the case of the long shed.

The loom-speed for artificial silk should be approximately 140 picks per minute. The majority of manufacturers who use artificial silk find that more skill is required to manipulate the weft than the warp. Artificial silk, being a dry and springy material, is very lively, and balloons when weaving. It leaves the cop or quill in ring or curl form, and, therefore, it is necessary to straighten out the shoot before it is beaten up to the neighboring pick. If not straightened out, the result would be a slack pick, which is as objectionable a defect as a bright or tight one. Slack, bright, or tight picks are the greatest evils in artificial silk weaving. To prevent these faults, it is essential that the drag on the weft be regulated with as soft and tough a material as can be obtained. Rabbit skin or wool felt should be placed inside a shuttle having only one eye. The shuttle-eye passageway should also be padded, using a soft worsted material. This, in conjunction with the lining of the shuttle, is considered to be one of the best means of putting on drag, because it can be regulated to whatever tension is required.

Other precautions to be observed to prevent these faults are:—the pick must not be too strong; the shuttle must be properly checked and on no account allowed to rebound; the shuttle-guide must be covered with swansdown on the face-side within the shuttle-box, to prevent the cutting of the thread; the cops or quills should be well corrugated, and should be cross-wound, to prevent an easy slipping-off. The yarn wound this way is less wavy than in the case of parallel quilling. Wavy filling will produce crinkled merchandise. Cutting of the filling is another defect requiring attention, particularly in broad work, and when the warps take up all the reed space. Often the cause of this trouble is uneven sides, and tight selvages on account of the warp's being narrower on the beam than the width in reed space. In weaving colors it is preferable to use two shuttles instead of one; that is—two picks from each shuttle. This will reduce to a minimum skein marks and shaded streaks which appear at times in skein dyed yarn. It is important, when looms are stopped over-night and week-ends, that the weaver should tighten the warp up before starting, as this will prevent crinkley effects or slack yarn in the cloth. In weaving fabrics that contain a small number of ends, that is—stripes of artificial silk, care should be taken to weave them as slack as possible, as

artificial silk contracts in the finishing, thus causing burley or wavy effects if woven with too much tension. It is preferable to use skein-sized yarn for stripe-effects, as this yarn does not contract as much as machine-sized yarn, in the finishing process.

Weaving plants should be operated under a dry atmosphere, similar to that described with reference to the winding and quilling operations.

Cotton Manufacturers Meet at Boston

The program of the fall meeting of the National Association of Cotton Manufacturers—held in Boston at the Copley-Plaza Hotel on October 31 and November 1, in conjunction with the International Textile Exhibition—showed careful thought in the selection of the subjects to be discussed, and the personnel of the speakers and the manner in which the topics were developed, made this, the 115th semi-annual meeting, a most successful and helpful occasion.

Reports of officers and committees occupied the first session, which was opened on Wednesday morning, October 31, by President Robert Amory. Harry C. Meserve, secretary, reported for his office and also presented the reports of a number of committees. In making his own report, Mr. Meserve referred particularly to the research department of the Association, emphasizing the work it is doing along the lines of cooperative mill research, technical service, cooperation of government departments and technical societies, and the collection and re-publication of information. He pointed out that the membership of the association at the previous semi-annual meeting was 986, and at present is 1,018. He impressed upon the members that the keyword of the association office is "service," and urged them all to avail themselves of its facilities in any way desired. Treasurer W. Irving Bullard submitted his report which showed the Association on a good financial basis.

In his report at this session, President Amory cited the purposes for which the organization was formed, and urged the importance of coordinated effort along the lines of the Association's activities. With reference to business conditions, Mr. Amory said: "The half year since our last meeting has been marked with slow business and great uncertainty in our particular lines. Various causes have been assigned to this but the fact remains that cotton from over 30 cents in the spring fell to below 21 cents the last of August, accompanied by the usual slowing down in manufacturing. The present crop of cotton is, to say the least, disappointing as to size and, as a result, the price has shot up in two months to 30 cents again. We are, therefore, faced with a perplexing winter with high cotton and short supplies, producing costs for finished goods which it is difficult to persuade wholesale and retail buyers that the public will accept.

"With the short supplies of cotton available in the world, it is obvious that the mills of the world cannot run full. There isn't enough cotton. Therefore, the price of cotton has advanced and must remain high enough to force a considerable curtailment. Whether the present price is high enough to produce the necessary results, no man can foretell, but one thing is certain: we cannot have sufficient cotton to run full time."

Consideration of Industrial Relations.

The afternoon session on Wednesday was devoted primarily to discussion of employer-employee relation plans and systems. The first feature was the report of a committee for changes in the by-laws of the organization, by Albert Greene Duncan, and one part of this report precipitated a lively discussion with reference to whether a second meeting during the year should be mandatory or optional with the board of government, and it was voted that the by-laws should read that the second meeting during the year "shall be held," instead of "may be held" as suggested by the committee, at a time and place to be decided by the governing board.

The first main address of the session was presented by J. F. McCrudden, of the Aberfoyle Manufacturing Company, Chester, Pa., who discussed the service work of that organization in Chester. Mr. McCrudden said that the mill-workers at Aberfoyle had so been developed that now the Aberfoyle employees "as extensive property owners are admired, respected and accepted as leaders in the community," and that the credit for the change was due to the service or personnel work of the company, which he outlined rather clearly and completely.

In organizing the service work at Aberfoyle, said Mr. McCrudden, the first step was centralized employment, and all matters of hiring, transfer, discharge and rate change are referred to the service department. The Aberfoyle has four mills, and each has its own service-employment department, rest room, cafeteria, dispensary, etc.

In telling of the company's medical dispensaries, Mr. McCrudden said, "Absenteeism is even a bigger problem than labor turnover in almost any industrial plant. This difficulty brought about the establishment of fully equipped medical dispensaries and the full-time doctor gives a general physical examination to each new employee, as well as furnishing free medical services in all but confinement cases, to Aberfoyle employees. The dispensaries in the plants are under the supervision of trained nurses. The two larger plants are provided with a patrolling nurse whose duty it is to keep in touch with all members of the service committee as well as other employees, and to report on all conditions found during her patrol. The plant doctor divides his time between the four mills."

Dental dispensaries, a chiropodist and an absenteeism visiting nurse are among the other features of the medical work, said Mr. McCrudden. The nurse is furnished with a report of all unexcused first day absentees, and calls on these workers, with the result that Aberfoyle continues to hold a steady place for lowest absenteeism for the plants of that vicinity. He stated that this was doubtless due in large part to the fact that the absentee is called upon on the first day of absence.

The company provides life insurance pensions, health and accident insurance and maternity benefits, and maintains cafeterias, rest rooms, bands, libraries, and savings funds for encouraging thrift, said the speaker, who continued that "all of these activities are controlled principally by the employees themselves through the medium of a

shop representation system, known as the service committee. Representatives are selected by departmental popular ballot from all departments, and it is absolutely an employee vote, as foremen and executives are not permitted to bring influence to bear."

In describing this body and its duties, Mr. McCrudden said: "The service committee is a non-executive or advisory body, organized for the purpose of educating employees regarding plant policies and the correct method of reporting difficulties, and for the purpose of promoting their cooperation with the foremen and the executives of the plant. Any suggestions, complaints, matters pertaining to production and anything of interest to employees may be brought up in its meetings. All items will be given prompt and serious attention through the service department, and action will be taken immediately or explanation made as to why requests cannot be complied with. The management finds that it is to its advantage to use this committee as a medium for laying before the employees the difficulties often found in complying with some of their requests, and it always endeavors to lay *all* the details before the committee.

"The Aberfoyle Manufacturing Company has always made clear to its employees that the management of the plant is at all times in the hands of the executives of the company and consequently the employees *do* understand that their service committee is a non-executive body and it functions in an advisory capacity only."

The service committee meets every two weeks on company time, piece workers getting paid at the average rate of the hourly earnings of the department in which they work.

Other activities under the service committee as described by the speaker are: recreation, loans, supplying of coal, vacation pay system, textile school cooperation, etc. The department assists in securing coal for employees, payment being made by the deduction of three dollars per week from the pay envelope.

"The Aberfoyle Manufacturing Company closes its entire plant the week before Labor Day," said Mr. McCrudden, "and provides a vacation pay system for all employees who meet the requirements as set forth by the service department. The company sets aside for the purpose of computing the vacation pay to be allowed, the period beginning March 26th to October 27th, of the year. For all employees who have a rating of 100 per cent for attendance during the period named, 100 per cent of their average weekly pay is given. For the employee who has one day of unexcused absence, 90 per cent is given; 85 per cent is given for two days unexcused absence, and a reduction of 5 per cent for each additional day of unexcused absence until the total reaches seven days on which 60 per cent pay is allowed. Over seven days of unexcused absence, no pay is allowed. This has been considered profitable by the company, and has resulted in maximum production during months which formerly were a source of considerable trouble in this respect."

Textile school courses are provided ambitious employees by advancing the full tuition fee plus carfare, and then deducting ten per cent weekly from wages until the whole amount is refunded. At the end of the school term, if the employee is successful in obtaining a certificate from the textile school that all requirements of the student have been complied with, the total amount deducted from wages or salary of employee is refunded him.

One feature of the Aberfoyle service work as described by Mr. McCrudden which is unique and interesting is that the company established a country club for employees. Concerning this, the speaker said, that it is "comparable with any other in this country for comfort and recreation. This model clubhouse is provided with artistic sitting rooms, exchange, dining room and the wide verandas are used in conducting dances during the winter season; they easily accommodate over one hundred couples. This club is situated about one and a half miles out of Chester and is reached, within walking distance, by two car lines.

"After the club was obtained, it was turned over to the employees to run and govern. In the first and second years of its history, the management assumed the greater share of the financial responsibility in the effort to educate the employees to take an interest in it and out-of-door life. The membership during this time grew steadily and in February of last year the club expenses were put on a budget basis, and through the membership fees, numerous and various sports, recreational activities, and other attractions, it has been practically self-supporting. A big bazaar forms a large source of revenue and gives the women employees opportunity to display their ability as needleworkers, cooks, etc." Mr. McCrudden also cited other instances to indicate the resourcefulness of the operatives in securing funds for the maintenance of the club when it was placed on this basis. The membership fee of the club is $5.00 per year, or $6.00 per year taken out of the pay envelope at 50 cents per month. This has been a great aid in relieving the routine of work, in promoting a love for outdoor life, in encouraging participation in all forms of athletics, and in creating good-will and fellowship among the employees. Tennis courts, dancing pavilion, moving pictures, baseball diamond and swimming pool are other features of the club.

In answering the question of how the company overcomes the presentiment that often comes in the mind of the worker, that the money expended on service work would be more preferable in the pay envelope, Mr. McCrudden said: "Our answer is that it is all a matter of education in convincing the employee that benefits extended, to include his happiness, contentment, and permitted to reach every member of his family, together with more constant employment, produce a far greater return than money in a pay envelope that would only produce a temporary benefit to the wage earner. Fortunately, our employees are in a position to see for themselves that all of this has actually happened.

"Does this extensive service work pay? Is it appreciated? Aberfoyle Manufacturing Company has been forced to consider this question from an absolutely self-interested viewpoint. It is true that service work can only bring intangible results with no method of actually measuring them. But throughout Aberfoyle there is a spirit of good fellowship and eager cooperation which warrants the unanimous 'you bet it does' which comes from executives and all employees when the question is put to them." As tangible evidence of the results, Mr. McCrudden cited that Aberfoyle has been kept running with nearly full production during the troublesome past two years.

Essential to the success of any service work plan, said Mr. McCrudden in conclusion, the executives of a plant

must be entirely sold to the idea that the things proposed are absolutely sound and constructive, and that no halfway attitude will answer.

Following Mr. McCrudden, H. Gilbert Franke, service manager of the Pacific Mills, Lawrence, Mass., outlined the plan of employee representation at those mills. In beginning, Mr. Francke emphasized that this plan is based upon honesty and plain everyday common sense, and told of how the plan was gradually developed, and some of the definite results being secured through it. He pointed out that in the beginning, realizing that the overseers could make or break any labor policy of the company, the companys first step was to convince these men that employee representation was a good thing, and investigational trips to other plants were made by overseers to witness this kind of plan in operation.

In organizing the system, a preliminary committee consisting of 11 employee representatives was elected by employees by ballot to work with 8 management representatives to devise a plan that would fit the need. Plans already in operation were studied, and visits to other plants made by the employee members of the committee to see these systems in effect. After much consideration and discussion, said Mr. Franke, the following plan was adopted. (He stated that he would be glad to send detailed copies of the plan to anyone interested upon application.)

"Our plan," he said, "creates four shop councils composed of employees elected by secret ballot in the proportion of one representative for every 175 employes in a department and an additional representative for each additional 100 employees, and management representatives appointed by the management from persons of the rank of second-hand or above. The above provides that the number of management representatives shall never exceed the number of employee representativs, but in actual practice the management representatives in the shop councils are in the minority by a considerable margin. Each shop council has two standing committees, each one of which is composed of three management and three employee representatives. These committees are called (1) the production and factory conditions committee which considers matters of wages, discipline and production and (2) the health, safety, and general activities committee which, as the name implies, considers those subjects which do not fall under the heading of the first committee. The idea back of the creation of these two committees was that many subjects would come up for consideration in the shop councils which would need careful study and investigation and that the shop councils were too unwieldly to undertake work of this nature. Finally the plan calls for what we call the plant committee which is composed of the four employee chairmen of the shop councils and a fifth employee chosen by them and five management representatives appointed from among the treasurer, agent, the three superintendents, the mechanical engineer and the service manager. It is the duty of this committee to consider those questions upon which no agreement is reached in previous committees, to consider questions which affect the plant as a whole and to act as a committee on routine, procedure and election."

The plan provides that if an employee has a grievance he must first take it up with his overseer, then if it is not adjusted properly the employee and the representative can take it up with the overseer. If it still remains unsettled the assistant superintendent or superintendent meets with all of them and if it still is unsettled, the grievance can be brought up in the shop council.

The prime purpose of the plan, as adopted, is as follows: "To promote understanding and fair dealing between management and employees by (a) providing the employees with a means of expressing to the management their opinions on all matters concerning their working conditions; (b) providing the management with a means of consulting with the employees on matters of mutual concern. The committees to be established under this plan are advisory and are for the purpose of assisting the management in making its decisions with due regard to the point of view of the employees."

In commenting upon the plan, Mr. Francke said there were a few features which he considered somewhat unique. In the first place, it was stated at the beginning that the committees were advisory, for the purpose of aiding the management in making its decisions with due regard to the point of view of the employees. Other concerns, who predicted that this would kill the whole proposition, said it was necessary to give the employees some definite legislative authority to arouse their interest, declared Mr. Francke, but "we analyzed many plans that seem to give legislative functions to the employees and found that in most cases this function is so safeguarded that all the executive power actually remains with the management. We found that after all the employees expect us to conduct the business and that they do not want to assume the authority, but what they want is an opportunity to express themselves on the subjects which so vitally concern them and which heretofore have been so often decided without real information as to what the employees think about them."

Another feature emphasized by Mr. Francke was that the system is built up around the production men and makes the overseers and superintendents a definite part of the plan rather than featuring "an industrial relations department of the high-falutin' type, a type which is fortunately dying a natural death." The overseers and superintendents, the men who face the problem of industrial relations from day to day, are the men to whom the employees look for adjustments of their troubles and therefore they must be an integral part of employee representation, said Mr. Francke.

Furthermore, he continued, at the meetings of the shop council, the management is greatly in the minority. "There was a considerable feeling against this at first on the part of the overseers, as they felt that they would always be outvoted. We felt that if we opposed thirty employee representatives with the same number of management representatives that we immediately gave the impression that the shop council had legislative functions and that we had a solid front of management representative to block anything that we disliked. When we explained that the purpose was to get the point of view of the employees and to give to the employees our point of view, and then gave the management representatives to understand that they were to act on their own judgment at these meetings without any definite instructions from the management how to vote, then this feeling began to subside."

In citing definite results of the operation of the system, Mr. Francke gave some ordinary illustrations of the manner in which the committees function: "The question

came up why the filling was breaking to such an extent in one of our weave rooms. The weaver blamed the spinner, and the spinner the weaver, and no agreement was reached when these two overseers took up the matter with the assistant superintendent. Finally the employee representative from the weave room proved conclusively how the size of the bobbin was causing the breakage of ends." In illustrating the reaction of the employees to the effects of the employee representation system, Mr. Francke said, "A loom-fixer was describing to me what used to happen in his room when something went wrong with the cloth. The overseer would call in the second hand and give him hell, then the second hand would find the fixer on whose section the cloth was made and give him hell. Then the fixer in turn would single out the guilty weaver and give him hell and so everybody down the line succeeded in getting sore. He then went on to say that now, instead of a general bawling out, the real cause of the trouble and the remedy are looked for. Another employee has described to me how for years he has felt that the entire relationship between employer and employee has been based on antagonism but that now he sees a real drawing together as our mutual interests are developed."

In conclusion, Mr. Francke gave it as his opinion that it isn't the provisions or system of any plan that make it successful; that the most perfect plan on paper will fail if that is all there is to it; likewise, the crudest sort of management and employees will succeed if the thing that really counts is added to it. "By this," said Mr. Francke, "I mean that the *spirit* which prompts the adoption of a policy of employee representation and which guides the conduct of the management under a plan of employee representation is the key to the success or failure of any plan. If this spirit is one of suspicion, of holding back until one sees what the other fellow is going to spring, and of autocratic dealings, then any plan of employee representation will deservedly fail. If this spirit is one of willingness to play the game with the cards face up on the table, of confidence in the employees and of plain, every-day common sense, then any plan will succeed."

After the presentation of these two papers, Russell H. Leonard, chairman of the Association's committee on industrial relations, assumed the chair and conducted a discussion on them. Mr. Leonard explained that the committee was created at the Providence meeting in the spring for presenting practical plans of industrial management, employee representation and to afford an opportunity for a free and open discussion of these subjects. He then asked for discussion from the members.

John A. Perkins, of Cohoes, N. Y., asked if Mr. McCrudden could furnish any information on the net cost per year of the Aberfoyle activities, and how much their production had increased since the work was begun. Mr. McCrudden answered that inasmuch as he is attached to the Aberfoyle selling organization, he was not familiar with the cost of the project, but with regard to the production, he said that while he did not have the figures, "I know we run all the time now, and I do remember the times when we didn't run all the time. I know we are putting in additional looms and making additions, and we haven't had a shutdown in three years, and there has been considerable improvement both in quality and in quantity."

The suggestion that the Association's committee send out a questionnaire to determine to what extent this type of work is carried out by Association members was made by Gilbert Thompson, treasurer, Berkshire Cotton Company. He indicated it as his belief that a number of New England mills are doing this work, though possibly not quite so elaborately as that of Aberfoyle, and are doing it quietly, and he felt that information of this kind should be brought out and disemminated. Mr. Leonard stated that this had not been done up to the present.

At this point Mr. Perkins presented his personal views on the matter of employee relationship. He said that in the old days the people working in many of the mills received the same treatment at the hands of the overseer and superintendent that a dog would that had stolen a joint of meat, "and it is no wonder to me that a lot of those very same institutions have to put in welfare work and industrial relations to get a semblance of respect from the employees. I was one of the help for a long time, and I have been an employer of help for a long time, and I haven't found it necessary to spend a whole lot of money to do those things. Perhaps I am wrong and perhaps I am getting into that period of life where they say 'he's an old fuddy-duddy,' but I don't think I am quite, yet.

"I remember one instance of a man saying to me, about a mill in which I had worked, 'You worked there quite a while; it was some experience, wasn't it?' I told him 'yes, it was. I learned more things about what not to do while I was there than I have learned in every other place I ever worked.' There's where the whole thing is wrong. The management of the mill starts it generally, and like master, like man. If you have a bull-dozing agent, you will find it all the way down, but if you have a courteous gentleman with a kindly heart in his bosom at the head of the mill, you will find it that way all the way down."

Mr. Perkins related an experience at a mill several years ago where a number of looms were stopped. "Nobody tried to make any better hands," he said. "If a worker didn't do what was right they kicked him out. I would ask a second hand what he was going to fire a man for. 'Well, he did so-and-so.' And I would ask, 'Who have you got to put in that place? Don't you think you can make a weaver out of that material quicker than with a learner who has never been in a mill?'

"My experience has been that I have had to fire very few workers. There is very little difference, I find, in the rank and file of them. One man or woman excels another in one line, and another in something else, and if you look for the shortcomings you can find them, but if you look for the good in a man or woman and try to bring that out and encourage the person, you will generally make good help out of them. But there are two things that I fire a man for. If they say 'I won't,' they're gone. They can get drunk once and get another chance. The second time they get drunk, they are done with me."

Mr. Perkins said that his rule in dealing with help is "a civil answer to a civil question—and accommodate when you can." He cited a number of instances of personal assistance he had given operatives, and the result he got.

One day when he was an overseer, said Mr. Perkins, "I went down through the alley, and there was a girl who looked as though she would like to jump out of the window, her nerves all torn to pieces. I went over and said, 'What's the matter, Mary?' 'I can't do a thing,' she said. 'Sit

down on the stool and give me a reed opener and I'll help you for a while,' I told her. I saw one loom kept breaking ends out. I called the fixer over and showed him what the matter was and told him to get it fixed. In about an hour I came back and said, 'How are they running, Mary?' She said, 'Oh, Mr. Perkins, if I had only gone after you in the first place!'

"There you are, if you'll do those things, you don't need any of these social relations. You don't need it at all, if you'll just put yourself in their place.

"And I haven't found it necessary to spend a lot of money," he continued. "Our people out in the mill started a benefit association. They came to me and said, 'We would like to start a benefit association.' I told them to go ahead, and asked them what they wanted me to do. 'We don't want the company in it,' they said. 'All we ask you to do is to give us that room up there.' I said, 'All right, go to it,' and the only thing I did was to buy some tickets to their dances. They charge ten cents a week, and they pay six dollars a week sick benefits, for thirteen weeks, and they give $100 for death benefit. The ten cents a week doesn't pay it, but they have suppers and dances, and manage to get by, and they are doing fine. And, by the way, since that benefit association started, there have been no more labor unions in that department.

"I don't know as what I have said will do you any good, but it isn't so expensive my way as the other fellow's, and I think I get as good results because I don't have any machinery stopped, either; since 1896 I haven't had any machinery stopped in any mill I have had anything to do with."

Mr. McCrudden said that "I think Mr. Perkins has the finest industrial relations system that I know of. He is on the right track. He doesn't realize it, perhaps, but he has an industrial relations department, and he is the director."

Referring to the Aberfoyle plan again, Mr. McCrudden continued, "In regard to cost, there is one thing we would like to dispel from your minds; in thinking of these problems we tell our employees frankly that we are not spending one penny on them for which we are not getting two cents back. And they don't want paternalism. They don't want anything given to them. We tell them the more production we can get, the more profit we can make and the more we can return to them."

Chairman Leonard asked Mr. Perkins what arrangement he has made while he is away from the mill. "When I was overseer I was in the city government and had to go out once in a while to meetings of different boards," replied Mr. Perkins. "One man said, 'It's funny some of you fellows can be away so much. I can't.' I said, 'It's a mighty poor organization if a man is running his mill so it won't run when he isn't there.' If things won't function when he isn't there, they had better get a new man at the head of it."

"I appreciate that remark," said Mr. Leonard, "but I hardly think it answers the question. What I had particularly in mind was your instance of service to the woman in the weave room. If you had happened to be away, what would have happened?" "She would have just dubbed along, I guess," said Mr. Perkins. "There are lots of them dubbing along." "The object is to have that working every day and not depending upon the efficiency or interest of any one person," explained the chairman.

Mr. Leonard asked Mr. McCrudden how long it had been since Aberfoyle had had a strike, and the reply was, "We had our last strike eighteen years ago, when the beamers struck for $18 a week. Now, I think, they get $54."

The last feature of this session was a paper on pulverized coal and its uses by F. W. Dean, of Boston.

The social feature of the convention was in the form of a cabaret-supper on Wednesday night. This affair was in charge of a committee of ladies and was voted a complete and enjoyable success.

The Thursday Morning Session

considered the development of the cotton manufacturing industry from the standpoint o fmanufacture, design of fabrics, and distribution. Gilbert T. Thompson, treasurer of the Berkshire Manufacturing Co., Adams, Mass., discussed the development of manufacturing from three angles; first —the development of the various machines and different processes in the past 25 years; second—the development as to operatives' working conditions; third—the development

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of cooperation and the fostering of favorable understanding with the operatives and public sentiment in relation to the cotton manufacturing industry.

In discussing the first point, Mr. Thompson stated that there have been few changes, other than refinements, in the different processes during the past quarter-century. Listing some of these newer developments as follows: the introduction of the bale-breaker or hopper opener combined with a blast and suction, condenser and distributing lattice; the high productive comber; tape-drive on spinning; the drawing-in machine; and automatic looms. In summing up the development from this angle, he pointed to the need for a development in machinery to reduce cost because of the higher cost of raw material and labor.

With regard to the improvements in working conditions, Mr. Thompson cited the effects of proper ventilation, humidification and dust removing systems and the adoption of electrical driving apparatus.

In discussing the development of cooperation and the fostering of favorable understanding with operatives, the speaker said that this phase of cotton manufacturing "seems to have been one which was dead and buried in the early days of my connection with the industry. Manufacturers seemed at that time to have entered a period in which the operatives' point of view did not exist; no effort was made in larger centers to understand them or to have any personal touch with them. The dread of discharge was the incentive to work and the spirit of loyalty was hardly active, and this period seemed barren of intelligent direction towards a mutual understanding, on which could be built the foundation for an ever-increasing supply of loyal, intelligent, and ambitious operatives. American-born young men and women would not work under these conditions and it was rare to find them in the mill. Those who have lived in this country for five years or more and had come to some idea of our traditions, took the first opportunity to get out.

"The results were that we saw the passing of the English operative, the coming-in of the French-Canadian, their wane; the coming-in of the Portuguese immigrant, and lastly, the Pole.

"Later years have seen the manufacturer resurrect this former dead spirit of cooperation, understanding, and personal touch into a living, active spirit, and it bids fair in the next 25 years of producing astounding results in the type of operatives which will be seen in our mills. Well-directed community work is being done, labor turnover is being reduced, a spirit of loyalty is slowly being awakened and the word has gone forth that the mill is a good place to work. College and high school boys have been awakened and are desirous of coming amongst us as a field for advancement. Such efforts as these are to bear richest fruit in the future."

Similar to these conditions have been the relations with the public, continued Mr. Thompson in taking up the final phase of his discussion, and he urged that the people be educated to the great value of the cotton manufacturing plant.

M. D. C. Crawford, research editor of "Women's Wear," spoke at this session on the development of design. Mr. Crawford pointed out the possibilities for inspiration and background in the creating of new designs, declaring that the museums of the country were replete with material of this kind, which had not yet been utilized to the greatest possibility. He declared that one of the great needs of the industry is artists with interpretive power and an understanding of artistic research, and for the bringing out of this, urged the establishment of contests by the American cotton industry, offering prizes for efforts toward merchandise of charm, interest and salability, prizes sufficiently large to attract the highest talent.

In every textile school in America, he said, there should be a course to stimulate appreciation and interest in the devolpment of design among the future mill technicians. He further suggested that the museums of the country should be urged to arrange special exhibits of historic fabric collections—and, he declared, the greatest opportunity lies in the historic arts—to attract local artists, including in this also the libraries and schools. He indicated that this might be made an annual affair.

The development and distribution of fine yarn fabrics was discussed by Charles Pinnell, of Fred Butterfield & Co. In developing new fabrics, Mr. Pinnell stated that the commission house often encounters opposition on the part of manufacturers, who, being primarily concerned with the problems of production, sometimes looks upon distribution and its attendant features as the responsibility of the merchant. However, he pointed out, it is rather a matter of mutual interest and requires cooperation from the mill in the regulation of production and otherwise, and in maintaining quality of product, together with a ready willingness to change and accept the losses entailed.

The Thursday afternoon session was of a technical nature, and was arranged by Russell T. Fisher, assistant secretary of the Association in charge of research. An interesting presentation of methods of handling artificial silk, considering it from the standpoint of the winding, copping, warping, sizing and weaving operations, was made by Warren F. Cooper, of The Viscose Company, whose remarks are reproduced in another section of this issue of COTTON. Another paper on artificial silk, discussing its possibilities in the cotton industry, was read by Bertrand R. Clarke, vice-president of the Tubize Artificial Silk Company of America, who traced the growth of the use of artificial silk in this country, and discussed its usefulness in cotton textiles. It is being used in the ribbon trade, which is further developing its use in connection with mercerized cotton for moires, plain staples, and novelties. Laces, curtains, braids, upholstery fabrics, millinery cloths, necktie materials, glove cloth, metals, shoe coverings, all represent classes of textiles whose field can be advanced by the introduction of artificial silk yarns to embellish and add to the value of the finished product, he pointed out. Another new field just beginning to open up for artificial silk is disclosed by braiders and covered wire manufacturers, said Mr. Clarke, the lustrous sheen of artificial silk and its clear, deep coloring make it a desirable covering for lamp cords, telephone wires and similar material. He said that as an insulator and covering for fine magnet wires, it has no superior when properly treated and applied. The application of artificial silk in the shirting trade and novelty dress fabric production was also mentioned.

Professor Stephen E. Smith, of the Lowell Textile School, spoke on "A Century of Progress in Cotton Manufacture." Professor Smith called attention to the fact that with the exception of the combing machine and the ring spinning frame with its ring traveler for twisting the strand, "we find that the yarn manufacturing equipment of a modern cotton mill is made up chiefly of machines that act upon the same principles as did those of one hundred years ago and more. The 'fly shuttle' is still flying back and forth at a tremendous expense of energy both in starting it in motion and stopping it at the end of its course. 'Roller drawing' with all its imperfections and limitations, is still the only practicable means of drawing the cotton fibers in our endeavor to reduce the size of strands. The 'carding machine', one of the most efficient cleaning machines in our equipment, still delivers its product in the form of a strand of curly, kinky, and only approximately paralleled fiber. The self-acting mule so largely discarded by our domestic cotton manufacturers still remains the only real machine for the production of the unusually fine, soft twisted and uniform yarns. The power loom, with its fly shuttle and reciprocating lay, still remains the same

power-consuming, din-producing operation that it has always been."

The speaker declared that this was not to say that no progress had been made in improving the methods of manufacture, as many improvements in machine design, and many devices and mechanisms added to the machines, with some additional operations calculated to put material in better form for economical use, all have been introduced—but in essential principle, the methods of cleaning, straightening and paralleling the fiber and reducing the strands to the desired size, as well as the fabrication of cloth, remain the same today as they were over a century ago, he stated.

In considering the imperfections of present operations which might be improved upon, the speaker began with the picker lap, which, he said, "will be considered by most critics to be too dirty and too uneven. To clean cotton in the picker, we are at the present time depending upon the beater to tear masses of fiber apart and largely upon the force of gravity to separate lint and dirt. It would seem that a method of beating which would reduce a mass of fiber to the smallest possible locks should result in giving us a greater degree of cleanliness, as most of the dirt particles will fall out of cotton if given a fair opportunity to do so. The most obvious step to be taken in securing this result is to enlarge the field of action of the pin beater and possibly to alter its design so as to make it even more able than now to break cotton into tiny tufts." It was pointed out that by obtaining this condition, it should be possible to secure a more uniform sheet of lap than is being secured under present conditions.

In taking up the card, Professor Smith said that he had always thought that the carding machine as now designed ought to produce a very uniform sliver provided it could be fed with a lap of uniform weight and thickness. "When one realizes that a yard of card sliver represents about one-third inch of lap it will be seen that the lap irregularities of very small extent may cause considerable variations in card slivers," he said, adding that in his opinion the present irregularities in the picker lap are due to the imperfections in the system of transporting cotton from the beater chamber to the revolving screens, and suggesting that the improvement of this situation by altering the air control, or by redesigning the flues connecting the beater chamber with the screens might be determined through extensive experimentation.

The speaker said that as a means of removing dust and fine dirt and very short fiber from cotton, the card leaves little to be desired, but falls short in effectiveness in providing a more accurate separation of fiber only a little shorter than is desired to be preserved. As a development to this end, he suggested the possibility of redesigning the card and comber, to produce a machine of a hybrid nature, when a sliver of a very different character could be obtained. "Given an improved picker lap and a new method of removing fiber from the doffer of this new carding machine," asked Professor Smith, "may we not hold up as an ideal card sliver a strand possessing the uniformity of the drawn sliver and the straightened paralleled fiber now seen only in the combed sliver?"

In discussing drawing rolls, the speaker said that in his opinion, progress in the manufacture of cotton yarn lies along the line of improvement or change in the methods of selecting fibers for spinning, to give a greater uniformity of fiber length in the masses or else a method of drawing which will recognize the fact that at present the most carefully prepared rovings are composed of widely varying lengths of fiber. The success of any effort to increase the speed of ring spinning is also predicated upon this improvement in drawing, he said.

Considering cloth fabrication, Professor Smith said that the loom still reigns practically supreme, but suggested the possibilities that lie in a circular loom, with the shuttle moving in a circular motion, as well as those that lie in an extension of the field of knitting, more especially the possibilities that are present in the method of cloth production known as warp knitting.

The Association Banquet

on Thursday evening brought the convention to a close.

SECRETARY H. C. MESERVE.

The feature of this occasion was the address of President Robert Amory, who dealt intimately and frankly with manufacturing conditions of New England as compared with other sections of the country. He referred to the fact that for the past year and a half there has been practically no new construction in New England, hardly sufficient replacement of new machinery to take care of that worn-out, and for the last two months, Massachusetts had run 66 per cent of single-shift capacity while the Carolinas had operated 121 per cent of this capacity.

In discussing the causes for this condition, Mr. Amory pointed out that New England's handicaps as to legislation are well known. "There are seventeen restrictive laws in Massachusetts," he said, "as, for example, the law forbidding the employment of women for more than 48 hours per week, compared with 54, 55 or more in competing states; the law preventing operation of textile mills with two separate eight-hour shifts per day where the shifts contain women. In stores or in laundries or in any other kind of work women can work in the evening up to 10 p. m., but in textile factories alone they are forbidden to work after 6. This is an example of the discouraging laws which have been passed against the textile industry. The effect of these laws, particularly this last one, is to prevent the operation of mills for a sufficient number of hours per week

to justify the cost of new construction. It should be obvious that to obtain sufficient return on the investment required to build new mills or to put in new machinery requires operation for more than 48 hours per week, either by the use of longer shifts or more than one shift."

Mr. Amory pointed out that proximity to the source of raw material is neither a necessity nor an advantage in cotton manufacturing, citing figures to indicate that those cotton mills located in the cotton-growing section, by states, use more cotton than they produce. He further declared that New England has an advantage in transportation rate in securing its cotton by water route, as well as having accessible the supplies of foreign staple from India, Egypt, Brazil, China and Peru.

With regard to operatives, Mr. Amory said:

"Now, as to labor, the Piedmont mills have bright, keen, intelligent, and American-speaking people, all white. They do not seem to have anywhere near exhausted their supplies of this labor and it is certainly good labor. In this connection, however, I know that the men in the South, who run these mills and who are in a position to know the facts, realize that many of the statements made against our New England labor are untrue. I am very tired of the attitude that our New England labor are foreigners and, therefore, clumsy and unskilled. This is not true. It is said on good authority that in Fall River 65 per cent of the textile operatives own their own homes. Can any other textile section of the country show on as large a scale as large a proportion of home-owners. It is hardly necessary to call attention to the fact that home owners make the best citizens and the best workers. True, many of these operatives were born in other countries and came to New England but they are making very good citizens. As compared with older countries, like England, we are all immigrants. It is simply that some of us have been here more generations than others. May I illustrate by another story: —One of our oldest mill treasurers was reminiscening the other day about first immigrant operatives who came to New England and he could remember their arrival. In the room at the time was a mill agent, a very able and capable man. This man spoke up and said that his mother was among that group of immigrants who landed from the ship, and that she had gone to work immediately in the mill. He himself had entered another mill at a very, very early age and had been in one ever since. This man is now the operating head of a great and successful mill. Now this story, while it is only one instance, would apply to a great many men right here in this room. Men, who are capable of accomplishing this sort of career, certainly cannot make bad operatives. Our New England operatives are hard workers. They have had great experience, some more than others, and as a group, have real skill. They are thrifty and save money and own or intend to buy their own homes. As a group, they have not their equal in this country and I doubt anywhere in the world. Our New England mills can challenge any other industries in the country, especially in regard to continuous work on the part of the operatives and lack of absenteeism from various causes."

The speaker next quoted authority with reference to the climatic conditions of New England as being advantageous to cotton manufacturing.

"The difference in cost of production between New England and other sections has meant that New England mills have suffered, as a whole, very intermittent operation, causing much temporary unemployment," Mr. Amory continued. "The staple, cheaper goods, which we formerly ran for stock when fancy goods were not ordered, have been taken from us by competition which could produce more cheaply. I think it is fair to state and you gentlemen in this room will fully realize that New England mills have seldom or never lost orders where they were able to meet the price. There has been no question about the quality of the goods provided the prices were equal. It is very seldom that a New England mill does not, at least, get the preference because of quality.

"After all," he concluded, "it is the men in an industry, operatives and management, that will finally determine whether the industry is to be successful or to deteriorate. To sum up these various arguments, it would appear that we have the men, we have the management, and we have the climatic conditions which keep both good men and management on their toes. There remains then, the question of legislation, which is much more favorable elsewhere than in Massachusetts and the welcome given to industry which is greater than we have hitherto received here at home." However, Mr. Amory said there were many hopeful signs of a change of attitude on the part of the public toward cotton manufacturing.

W. E. Beattie, of Greenville, S. C., president of the American Cotton Manufacturers' Association, who was a regular attendant upon the sessions of the national association convention, was called upon at the banquet by President Amory. Mr. Beattie had not prepared an address, but spoke briefly on several matters of interest, saying in part:

"I have felt for a long while that there was plenty of room in this country for all the manufacturers that are now operating both in the North and in the South, but in somewhat different fields. You have had more experience than we in the South. You are capable of making finer fabrics, more highly specialized in different lines. You probably have more skilled labor for these fabrics. You understand the market better, and it seems to me that it will be a long time before there will be competition in the South that will be seriously felt in that direction by the New England mills. There are a few mills in the South that make the finer grades of goods with mixed silk and artificial silk, but they are comparatively few, and I do not believe that that development is going to be particularly rapid.

"Now there are many problems that I could discuss with you, one of which is cotton. I know that many of you would like to hear my opinion in regard to cotton, but I haven't any. As old Colonel Hammett once said, as he listened with a great deal of interest to a discussion between two or three men with regard to what cotton was going to do, and he said that he couldn't form any very definite conclusions as to their opinion, he told them, 'Well, the opinion of all of you is probably all right, but I have generally found that cotton is a fool and that it never does what you expect it to do.' I do believe, however, that there is going to be a serious scarcity of cotton. But you have all the information along that line that I have, and the solution, of course, will have to be found when the emergency comes.

"There are many other problems, my friends, on which

our two associations can work together most harmoniously, and perhaps beneficially in accomplishing something that is worth while. One of those problems is the question of taxation. If you have not read the report of the National Industrial Conference Board, which was published about a year ago on the problem of taxation, I most heartily recommend that all of you who have not read it should do so most thoughtfully. It seems to me that it contains some rather ominous facts and facts which should be brought to the attention of the members of Congress as well as the members of the state legislatures, not only through papers that are published by the National Industria Conference Board, but by investigations that are carefully made and facts carefully compiled by the committees from the American Association as well as from your association.

"One pertinent fact that is brought out in this report of the National Industrial Conference Board, it seems to me, and which is the meat of the whole report, is in this one idea: the comparison between taxes and income of the country. Briefly stated, the Industrial Conference Board says that the income of the United States, the total income of the United States, is in round figures $50,000,000,000. Of that amount $37,500,000,000 is required for living expenses and for the maintenance of business, including depreciation and obsolescence. Catch those figures. The total income is $50,000,000,000. The total cost of living of the people of the United States together with the maintenance of business is $37,500,000,000. That leaves in round figures $12,500,000,000 to pay taxes and for new enterprises. Of that twelve billion and a half, eight and a half billion goes for taxes. That is, Federal, state and local taxes, eight and a half billions of dollars. That leaves in round figures four billions for new enterprises and the progress of this great nation. They state that investigation shows that it requires about six billions of dollars for new enterprises and new capital for the country to make proper progress.

"I hope you catch those figures, because to my mind they are significant. Let us reduce them. Instead of saying billions we will say the income of a man is $50. It costs him $37.50 to live and run his business. That leaves $12.50 for him to pay taxes with and to start new business or to expand his present business. Eight dollars and a half for taxes. That leaves him four dollars, and he has found by past experience that it requires six dollars for him to make any progress. You can see at once that unless something is done either to reduce taxes or to reduce the expenses of the Federal, state and local governments, that this great country is not going to make the progress in the next decade that it is due to make, and it seems to me that committees can by investigation find out something about the expenses of the various bureaus in Washington and the various bureaus in the state governments that will be something that will be worth while to present to the members of our legislatures and our Congress.

"I was told by a prominent lawyer in our town that there were fifty-one committees and bureaus in the state of South Carolina, and he said to me that there was one of them, according to his recollection, that they got about $4,000 for buying $200 worth of stuff. Now whether those figures are accurate or not, I can't vouch for them, but it wakened me to the fact that something should be done to investigate the various bureaus just like a business man would look into the various departments of his business, and find out whether there isn't some deadwood there and whether he isn't spending too much and whether something couldn't be cut off.

"We have had one serious talk. I am not going to prolong another one. I just simply threw out this one thought for your consideration and which I am going to discuss a little more earnestly with Mr. Amory privately in regard to the appointment of committees. I am glad to be with you. I feel honored at your invitation and I feel that the good fellowship and the harmony should increase as the years pass between the northern and the southern associations."

Following Mr. Beattie, B. F. Griffin, associate editor of the Boston News Bureau, spoke on economic conditions, and the final speaker was Captain Irving O'Hay, the original character of Richard Harding Davis' book, "A Soldier of Fortune," who entertained the diners with an amusing recounting of his various and varied experiences.

Saco-Lowell Shops, Rogers W. Davis, Charlotte, N. C., southern agent, have sent out a picture showing in one group the six plants of the company as they appear today. This group includes the Lowell plant, the Kitson plant, the Pawtucket plant, the Biddeford plant, the Newton Upper Falls plant, and the Charlotte office and shop. This enormous and important industry has grown to its present size from the original Lowell Machine Shop, established in 1824, and from the small plants of the Lowell Machine Shop, the Pettee Machine Works, the Saco Water Power Company, the Kitson Machine Shop, and the Pawtucket Spinning Ring Company, the organization has developed into the outlay shown in the picture. Each plant specializes in building certain machines, with all under one executive management, and with each trying to better its product by concentration.

The Charlotte office and repair shop is the newest unit of the Saco-Lowell development, and it is anticipated that this will be enlarged and its scope extended in the future.

A helpful booklet for construction and building work is the Truscon metal lath data book, recently issued by the Truscon Steel Company, Youngstown, Ohio. Solid plaster partitions, walls, floors, roofs, attached and suspended ceilings, together with practical information for interior plastering and stucco work, are some of the subjects covered in a manner that makes the contents of interest and value to those engaged in construction activities. The publication is the result of a year's investigation, during which period nearly all the practical uses of metal lath were studied, and the specifications used are adopted from those compiled by the principal metal lath manufacturers with the cooperation of the American Specification Institute. The book contains tables of loads and properties of all types of Truscon Hy-rib metal lath, and other useful technical data.

Be honest with yourself. It's a good rule to live so you can look every man in the face and know you are as honest as he is. You may be able to deceive others, but you can't deceive yourself.

The Boston Textile Show

There were several features which might have detracted from the success of the International Textile Exposition this year, but all in all it was an exceedingly interesting and valuable exposition. The show was held in its usual home, Mechanics' Building, Boston, during the week of October 29 to November 3. It was conducted, as have been its predecessors, under the personal direction of Chester I. Campbell and his efficient staff—and the manner in which the whole exhibition was managed during the week placed credit to these directors and to the Textile Exhibitors' Association, under whose auspices this exposition is held.

Considering the exhibits in the show, a very noticeable feature was the number of representations from the South which were included this year. Cities and power companies and other organizations had attractive displays resulting in a combined effect of "boosting" their respective sections and exploiting the advantages of this territory as locations for manufacturing plants.

In this number, Greenville, S. C., through its Chamber of Commerce, had a display of textile products manufactured in the mills of that city, ranging from goods of the heavier grades to the finer shirtings, silk-and-cotton ginghams, etc., and charts and literature explaining the section's power and other advantages were distributed.

The Spartanburg, S. C., Chamber of Commerce represented that city with an exhibit showing the growth of Spartanburg as a textile center and exploiting its advantages.

The Georgia Industrial Bureau, a recently organized medium for the development of Georgia industrially, was represented by Frederick H. McDonald, managing director, and the exhibit pointed out Georgia's advantages for location of new industries from the standpoint of power, labor, natural resources, etc.

The Alabama Power Company and the Georgia Railway and Power Company were also exhibiting for the purpose of presenting their respective states for consideration. The former company displayed a map of Alabama illustrating various industrial features, together with stereoptican views of plants within the state. The Georgia company maintained a moving exhibit showing by a large relief map the hydro-electric power development of the company in the northern part of the state.

Competent staffs of representatives were on hand at all times to demonstrate and answer inquiries at all of these booths, which were centers of attraction throughout the week. Acquaintances were made and contacts established that were calculated by representatives to prove of much future usefulness.

In addition to these displays, the number of southern concerns manufacturing and representing machinery, supplies, and accessories, and other equipment, was to be noted, and this was pointed out to indicate the expansion of the industry in that section.

With the exception of a majority of the larger machinery manufacturers, who did not exhibit at Boston this year, there was possibly a representation of other machinery and supply concerns which measured up to standard in point of number; and certainly the character of the exhibits themselves indicated careful preparation as to their attractiveness and value. There were several instances of new equipment and devices which were being displayed for the first time.

In accordance with custom, the National Association of Cotton Manufacturers held their semi-annual convention at the Copley-Plaza Hotel in Boston during exhibition week, and had in the exposition an exhibit of especially timely interest. The Association's display was divided into two units—one of which, prepared under the direction of the exhibition committee of the organization, contained a wonderful collection of ancient and modern cotton fabrics, which created much interest from the standpoint of indicating the development of the industry as represented in its products, and in pointing to the advantages to be gained through the diversification of style of product at the present time. The modern fabrics exhibited were produced by mill members of the Association. The other Association exhibit was devoted to the demonstration of some of its service activities as an organization.

Correlated in effect with the Association's fabric display were the exhibits of a number of commission houses and selling agencies, who showed samples and gave demonstrations of textile fabric products. During the week of the show there was also a special exhibition of textile products at the Boston Museum of Fine Arts which was accorded much interest.

In the exposition, the New Bedford Textile School's display also added to this effect in its presentation of work accomplished by students in the school's various departments. The Bureau of Foreign and Domestic Commerce display was also of interest in this connection as showing the products of foreign textile mills.

These displays, together with the exhibits of individual concerns, combined to present a striking demonstration of the scope and magnitude of the industry's product, creating interest in what has been and is being accomplished, and served as an incentive for further endeavor and effort in this direction. One feature that was noted in some of these displays was the demonstration of the substitution of the cotton fiber for other materials, such as wool and silk, etc.

This effective presentation of the industry's products, combined with a purpose apparent in the National Association's program to direct thought and interest along these lines, by means of important papers on such subjects, made this one of the outstanding features of the week.

The attendance at this year's show was good, though possibly not up to the expectations of some. The attraction of the show itself, the National Association convention, the historic reputation of Boston and its surroundings as the location of many points of interest, together with the opportunity which the show afforded for the forming of contacts, the renewing of old friendships and acquaintances, the discussion of subjects of mutual interest by the mill man and equipment man, combined to produce an attendance of textile men which contributed largely to the show's success. There was the usual attendance, especially dur-

ing the evenings, on the part of the general public of Boston and its suburbs, and it is ofttimes difficult to accurately calculate the results produced by these people visiting and studying the show.

A particular feature of the attendance was the number of southern financial and operating executives who were present during the week, some who have been regular attendants in the past, and others visiting the Boston show for the first time.

The show was a success from the standpoint of the management and the exhibitors' association, and comments indicated that the same was true with most of the exhibitors.

Towels and Toweling

BY T. WOODHOUSE AND A. BRAND.

Fancy Twills.

Many varieties of ordinary and more or less elaborate twill weaves are used in the production of towels and toweling. Sometimes the weaves are employed in all parts of a complete towel, and at other times in the side border, in the end border, or in both. Many examples of this class of weave give very pleasing and characteristic effects in the cloth and it would be almost impossible to exhaust this source of weaves for the towel designer, particularly if the number of harnesses is not limited. The examples given in the following section are to be regarded, therefore, merely as typical fabrics of their class, and doubtless others of a similar nature will suggest themselves to the interested reader.

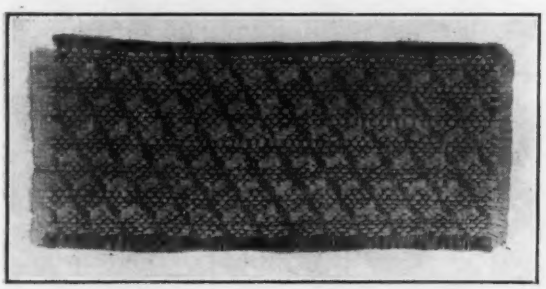


FIG. 20

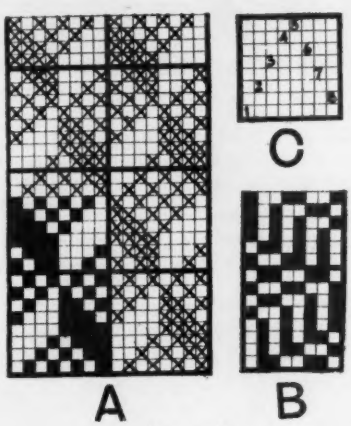


FIG. 21.

Figure 20 is a photographic reproduction of a toweling fabric woven with unbleached but boiled flax tow warp, and with bleached flax tow filling. There are 36 threads per inch in the warp, and about 40 picks of filling per inch; the filling is of slightly heavier counts than the warp, and is, of course, less twisted, and therefore softer.

The design for the cloth is complete on 8 threads and 14 picks, as shown in solid squares in the point paper plan, A, Fig. 21, where four repeats or units are given. If the unit weave is taken as a weaving plan, the fabric would require 8 harnesses and a straight draft—1.2.3.4.5.6.7.8. The cloth may then be woven with the aid of either a dobby or a positive tappet.

If the unit weave be examined more closely, it will be noticed that the 4th and 5th threads are cutting threads, i. e., the one interweaves in exactly opposite a manner to the other. Similarly, it will be found that the 3rd, 2nd and 1st threads are respectively the exact opposite of the 6th, 7th and 8th threads.

When weaves are made up of a number of pairs of cutting threads, it is often a good plan to put each pair of oppositely working threads on each pair of consecutive harnesses, and to couple each pair of harnesses with a plain top roller mounting. When this is done, it is often possible to use less intricate shedding mechanisms than would otherwise be necessary. For instance, in the present case it would be possible, in theory at least, to use a negative shedding tappet with its motion rendered perfectly positive by the plain top rollers. Were this done, the weaving plan would have to be altered to that shown at B, Fig. 21, and use made of the corresponding draft C in the same figure. This procedure, although perfectly correct in principle, could not be carried out in the present case, because negative shedding tappets, i.e., those which only depress a harness and cannot, of themselves, raise a harness, are not suitable for weaves with so large a number of picks to the round as 4, unless some type of small tappets are employed to act nearer the fulcrum of the treadle than is usual, and so minimize the over-all dimensions of the tappet.

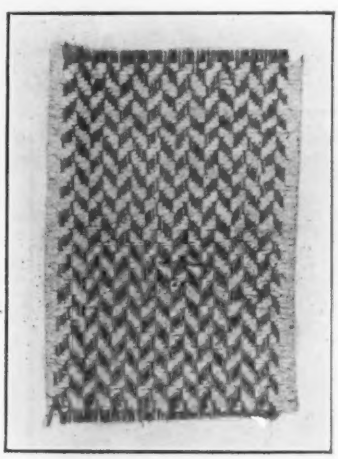


FIG. 22.

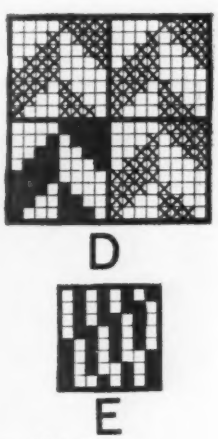


FIG. 23.

The same method of arranging harnesses that work oppositely in pairs can be employed in single-lift center-shed dobbies. One hook of each pair controlled by one needle can be attached, say, to No. 1 harness, and the second hook attached to No. 2 harness, while a cord from the bottom of No. 1 harness passes round a pulley near the floor and is then attached to the bottom of No. 2 harness. Each pair of harnesses is treated similarly; hence, the weaving plan would be the first 4 threads and 14 picks.

A somewhat similar fabric to that given in Fig. 20 is illustrated in Fig. 22. Although the numbers of threads and picks are practically identical in these two samples, that in Fig. 22 is not so firm in structure as that in Fig. 20. This is due to the absence of the plain interweaving parts. Compare design A, Fig. 21, with design D, Fig. 23, which exhibits four repeats, and shows that this weave is complete on 8 threads and 8 picks, and would require 8 harnesses. The warp is unbleached but boiled flax tow, while the filling is bleached flax tow; there are 36 threads per inch of warp and about 40 picks per inch of filling.

Weave D, Fig. 23, may be regarded as a derivative of the 4 up 4 down straight twill, of which only 4 threads and their opposites or cutting threads are used; or it may be considered as being formed from the 4 up 4 down straight twill by arranging the 8 threads in the following order: 1.2.3.4.8.7.6.5. If the weaving plan is made identical with the unit weave shown in solid black at D, Fig. 23, the draft will be straight over the 8 harnesses. But if the fabric is woven in a tappet loom with the aid of four plain

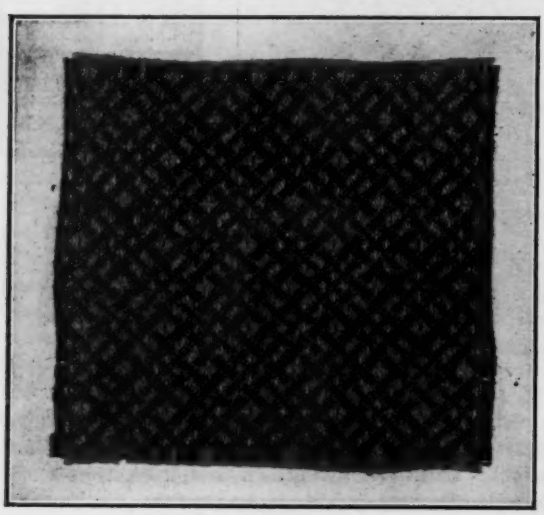


FIG. 24.

rollers, the weaving plan would have to be altered to E, Fig. 23, which is composed of four pairs of cutting threads, and the draft in the harnesses would then be identical with that shown at C, Fig. 21.

A typical example of an interlacing twill fabric is reproduced in Fig. 24. This particular fabric was woven for sample and demonstration purposes only; the yarns are of scarlet and green two-fold mercerized cotton, and the structure is somewhat loose, so that the fabric of itself is not particularly well suited for toweling purposes. Nevertheless, there are many towel fabrics less securely bound. The design, however, would make an excellent filling for a side and end-bordered towel, where the side and end borders are produced by distinctive weaves, or by distinctive colors, or by different filling effects, or by combinations of two or more of these methods. The warp is green and contains 48 threads per inch, while there are 44 picks per inch of scarlet filling.

Four repeats of the point paper design are given in Fig. 25, where the unit weave is shown in solid black squares, and the remaining repeats in crosses. The weave is complete on 32 threads and 32 picks, and requires 32 harnesses with a straight draft. The comparatively large number of harnesses is certainly a disadvantage, and makes the use of a dobby compulsory, or perhaps even a jacquard. At the same time it must be remembered that it is difficult to obtain such decorative examples without enlarging the scope of the shedding mechanism.

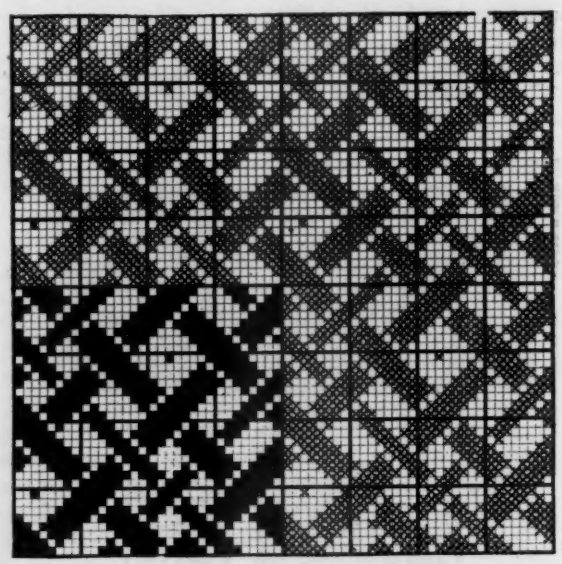


FIG. 25.

An examination of the two Figs. 24 and 25 will show that warp floats of 5 and 3 are so disposed as to produce one group of 3 bands (broad, narrow and broad) crossing, approximately at right angles, a second group of 3 bands (broad, narrow and broad). The longest floats of either warp or filling are over 5 threads. Isolated marks are in-

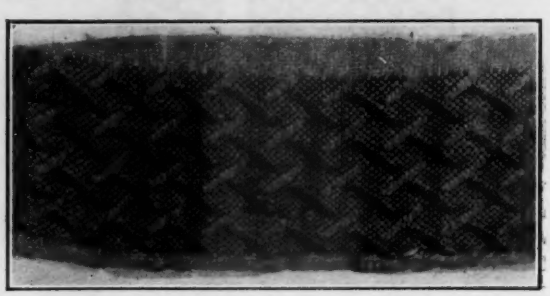


FIG. 26.

troduced in the center of the diamond-shaped spaces to split what would otherwise be floats of 9, and be unduly long for the particular setts of this fabric.

Details of another interesting example are given in Figs. 26 and 27. A small portion of the towel fabric, with the selvage at the left-hand side, is reproduced in Fig.

26. The warp is single flax tow yarn, bleached, while the filling is 2-fold indigo blue cotton. There are 48 threads per inch and about 56 picks per inch. The structure is firm, partly because of the large number of picks per inch, and partly because of the large amount of plain interlacing in the design.

It may seem strange to combine flax tow warp with cotton weft because weaving is more easily accomplished when the reverse conditions obtain. The present method, however, is often used when fringed towels are being made, because a flax fringe results. This particular pattern was also made for demonstration purposes.

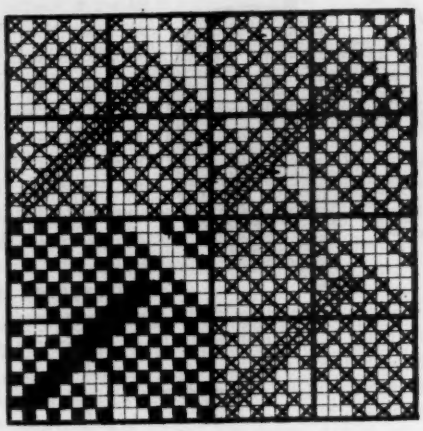


FIG. 27.

Four repeats of the weave appear in Fig. 27; the unit is complete on 16 threads and 16 picks, and requires 16 harnesses with a straight draft. The unit weave, shown in solid black, is derived from plain weave by adding marks to give a twilled warp stripe, and by omitting a corresponding number of marks to obtain alternate bands of filling on the surface.

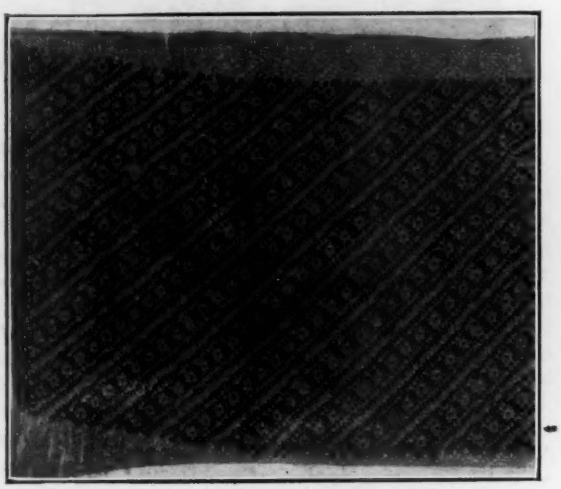


FIG. 28.

There is a certain amount of distortion of the filling during the finishing operation; this is due to intermittent variations in the rate of take-up of the warp and the large amount of plain interlacing in the pattern. This is evidenced in Fig. 26, where a number of picks have been removed from the top of the sample which was cut approximately perfectly rectangular.

A second example, woven with similar warp and filling, and in a similar sett to the fabric illustrated in Fig. 26, is given at Fig. 28. The cloth exhibits twilling bands of white warp alternating with twilling rows of small diamond figures. The corresponding point-paper design is reproduced in Fig. 29; it is complete on 16 threads and 16 picks, and requires 16 harnesses with a straight draft.

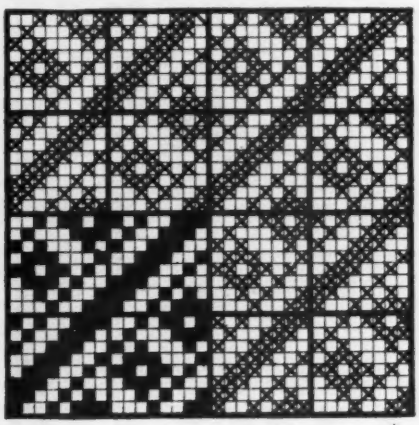


FIG. 29.

A further example, woven with the same warp and filling, and in the same sett as the fabrics in Figs. 26 and 28, is given in Fig. 30. The fabric presents a characteristic and effective appearance. A double stripe of blue filling flush alternates with a broad band of white warp flush, upon which is caused to appear in the blue filling an elementary Greek key pattern.

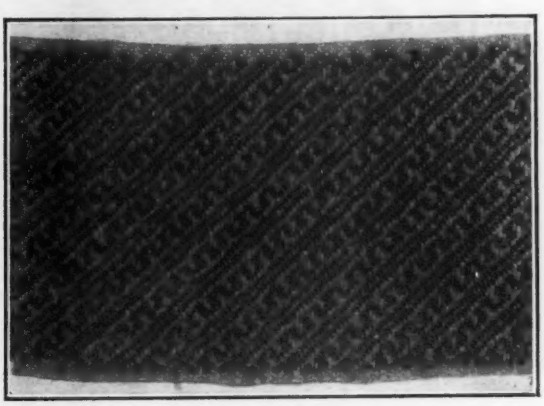


FIG. 30.

Four repeats of the point-paper design appear in Fig. 31; the unit is shown in solid black. The design is seen to be complete on 16 threads and 64 picks, and requires 16 harnesses. The comparatively large number of picks to the round might be considered a disadvantage in certain circumstances, but most modern forms of dobby can easily accommodate this number of cards or lags. If the design in Fig. 31 is compared with the two previous ones, it is questionable whether the large number of picks to the round is justified. But, of course, it must be remembered that the number of picks to the round affects the cost and

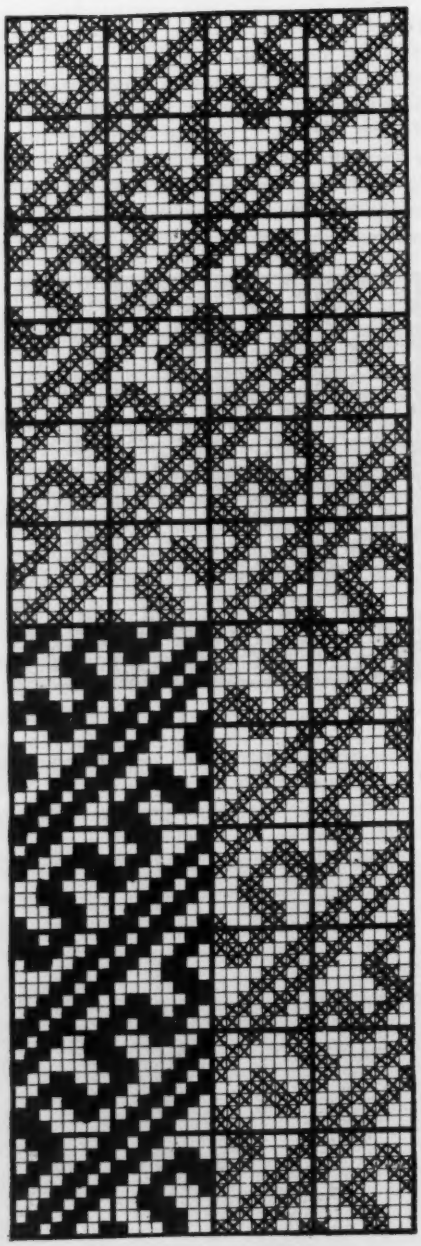


FIG. 31.

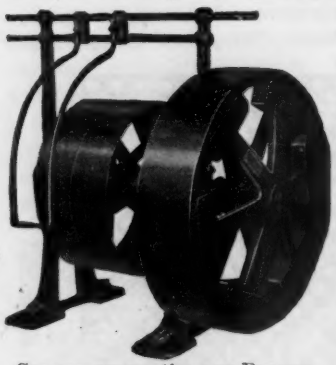
working of the fabric in a very much less degree than does the number of harnesses required.

(To be continued.)

The Mossberg Pressed Steel Corporation, Attleboro, Mass., have recently issued a booklet descriptive of their pressed steel products for textile mill use. The illustrations and descriptions therein present their loom beam heads of various types, adjustable, and for geared and friction let-off, loom beam barrels, section beam heads, beams for use in the manufacture of elastic tape and webbing, belt, tape and non-elastic web, silk ribbon and narrow silk fabrics, woolen, worsted and asbestos yarns. Other specialties shown are spools for Axminster looms, braider carriers and bobbins, take-up reels, and drop wires.

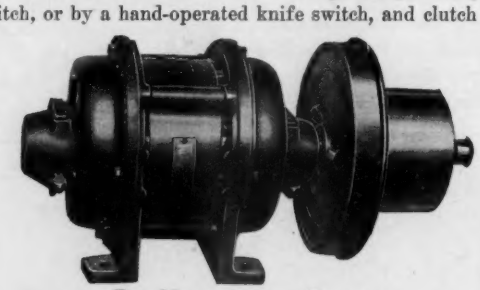
New Tolhurst Extractor Clutch Pulleys.

The countershaft clutch pulley illustrated herewith has been developed by the Tolhurst Machine Works, Troy, N. Y., for application on countershaft-driven Tolhurst extractors. The illustration sufficiently explains the application; the clutch pulley replacing the driving pulley. Slow and rapid acceleration may be readily obtained by a simple adjustment on the clutch itself, it is pointed out, and the belt may be shifted directly from the loose to the tight pulley, thus eliminating the time formerly necessary to "nurse" the belt onto the tight pulley. The clutch gradually applies the load to the power system, and eliminates belt-slip on both the extractor and countershaft belts, it is stated.



COUNTERSHAFT CLUTCH PULLEY.

For centrifugal extractors driven by belt from individual motor, the Tolhurst motor clutch pulley was devised. The motor is conveniently started by a push button located on the side brace of the machine, operating a magnetic switch, or by a hand-operated knife switch, and clutch pulleys are furnished separate or with the motor and starting equipment. It is stated by the manufacturers that the clutch pulley will start the extractor smoothly and rapidly without belt-slip or the usual heavy inrush of current, and that the clutch is so proportioned to both motor and extractor that smaller motors may be used and complicated starting equipment and specially wound motors made unnecessary.



THE MOTOR CLUTCH PULLEY.

Proctor & Schwartz, Inc., 7th St. and Tabor Road, Philadelphia, Pa., manufacturers of "Proctor" dryers and "Smith-Furbush" textile mill equipment, maintained the largest machinery display at the recent Boston show, the exhibit occupying 3,800 square feet of space and including six carloads of machinery. Included was the following drying machinery: a wool rag dryer and carbonizer, an automatic yarn dryer, truck yarn dryer, drawer type of dryer for hosiery, and an automatic boarding, drying and stripping machine for hosiery. The other machinery on display included a garnett machine, a worsted card, wool card and grinders. A working demonstration was given on the automatic boarding, drying and stripping machine for hosiery; also a demonstration of the carding of wool on the "Smith-Furbush" card.

What the Southern Mills Are Doing

In North Carolina during the past month one of the more important announcements in textile circles was that concerning the purchase of the High Shoals Cotton Mills, at High Shoals, N. C., by the Manville Jenckes Company, of Pawtucket, R. I., who also operate the large Loray Division at Gastonia. The purchase price of the High Shoals property, which includes a mill of 18,000 spindles and 524 looms and 1,200 acres of land, was said to be about one million dollars. It is understood that the new owners will develop this property after the manner in which they have extended their Gastonia property, which now comprises one of the largest units in the South, containing approximately 140,000 spindles.

The High Shoals mill was built by the late D. A. Tompkins and associates, of Charlotte, and was acquired by the interests of A. G. Meyers and the late C. B. Armstrong, in 1920, for $1,250,000.

Another North Carolina announcement of much interest is that Captain Ellison A. Smyth, who recently retired as president of the Pelzer (S. C.) Manufacturing Company, heads a new company to establish a mill at Balfour, near Hendersonville, N. C. Plans are being drawn by J. E. Sirrine & Company, and work is expected to begin shortly in the initial progress of the mill. The plant is to have originally an equipment of 10,000 spindles, with an ultimate spindleage of 25,000. Associated with Captain Smyth in this project are his son, J. Adger Smyth, and his son-in-law, John A. Hudgens.

The plant of the Gastonia (N. C.) Cotton Manufacturing Company will be moved from Gastonia to Burlington, it is stated. The company is to move its plant to Burlington and take stock in a new company to be formed, putting in the plant on an appraised value, on condition that the citizens of Burlington take stock in the new company to an equal amount to be used in the purchase of a site and the erection of not less than 60 operatives' houses. The plant at Gastonia consists of 10,800 spindles and 133 looms, and it is proposed to increase the weaving equipment to 300 looms when the plant is moved to Burlington. The reason to which the removal is ascribed is that at present the mill is located in the heart of the city, on property which the managers feel is too valuable for use as a manufacturing site.

The Rhodhiss Mills Company has had 300 Nordray automatic looms installed in the No. 2 plant in addition to the equipment already there. A new warp-tying machine has also been placed in this mill; and it is further reported that 420 Nordray looms will be added to the equipment at the No. 1 mill.

Statesville (S. C.) Cotton Mills have recently installed additional carding, drawing and other machinery in their plant, and have made improvements in the village, including work on houses and streets and surroundings.

About 35 cottages for operatives were recently completed by The Corley Mills, Inc., at Cumberland, N. C.

Steele's Mills, Rockingham, N. C., will make extensive additions and improvements to their plant, it is reported. A one-story addition, 75 x 100 feet, will be built to the main mill, to contain slashing and beaming equipment. Two new water wheels are to be installed and the electrification of the mill completed. A new power plant for heating the mill and for process work is to be added, and a battery of four new warehouses and a new opener and waste working room are also included in the expansion plans. Robert & Co., Inc., Atlanta, Ga., are the engineers in charge.

Replacement of old machinery with new equipment is being made by the A. A. Shuford Mills Co., at Hickory, N. C. Five pickers—two breakers and three finishers—24 new cards, two slubbers and four intermediates are being installed by the Whitin Machine Works.

Morven Cotton Mills, Durham, N. C., are adding sixty 57-inch, four-box looms from the Crompton & Knowles Loom Works.

An addition to contain 25,600 spindles and 720 looms is contemplated by the Dacotah Cotton Mills, Lexington, N. C., which now have 21,696 spindles and 650 looms manufacturing chambrays.

The erection of 250 houses is being carried on to provide for the operatives of the Mayflower Mills, the new weaving unit of Cramerton Mills, Inc., at Cramerton, N. C. New streets are being paved and sidewalks laid, and school and church buildings are also included in the development program. J. E. Sirrine & Company are engineers.

Caldwell Cotton Mills, Lenoir, N. C., are about completing the building construction on their new plant and machinery installation will begin soon.

Red Springs (N. C.) Cotton Mills are starting up 160 new looms on fancy goods and also four new spoolers and four beam warpers.

Groves Mills, Inc., Gastonia, N. C., have started operations in Mill No. 2, containing 15,000 spindles. The building is two-story, brick and steel construction.

In South Carolina, the annual meeting of the Cotton Manufacturers' Association of South Carolina, held on November 6th, at the Franklin Hotel, Spartanburg, attracted a number of executives. One feature of the meeting was a technical talk on "Textile Engineering" by Dr. W. M. Riggs, of Clemson College, and James D. Hammett, of Anderson, S. C., president of the Association, presented an able report, discussing essentially the question of taxation in the state, and also urging more interest on the part of manufacturers in textile education. Mr. Hammett was re-elected president, and R. I. Woodside, vice-president, with Robert W. Sullivan as secretary-treasurer. It was also voted in the business session to go back to the former custom of holding the annual sessions in the summer and making them of two day's duration.

The Cohannet Mill, of Fingerville, S. C., has been purchased by the Franklin Process Company, of Providence, Philadelphia and Greenville, S. C., and will in the future be operated as a subsidiary corporation of the latter company under the name of Franklin Process Spinning Mill, Inc. The new corporation is capitalized at $300,000 and its officers are E. S. Graves, president; L. W. Jones, treasurer; W. A. Traver, secretary; and H. W. Kirby, agent. The mill at present manufactures 20s/2 to 30s/2 cotton yarns, with an equipment of 8,844 spindles. Plans are already in progress to improve the equipment of the mill

and to increase its capacity as soon as conditions warrant. This new addition to the organization, it is pointed out, will enable the Franklin Process Company to serve its customers to better advantage. The product of the spinning mill will be sold exclusively by the parent organization.

Judson Mills, Greenville, S. C., recently opened up a modern cafeteria for employees. The food is served almost on a cost basis, being determined by the cost of the articles, plus a small amount for overhead and incidentals. Three meals a day are served, except that the cafeteria is not operated on Saturday nights and Sundays at present, due to lack of power during that period. The cafeteria has a seating capacity of 200 persons, and is modernly equipped throughout.

Construction work on the $250,000 dye house and finishing plant to be built by the Graniteville (S. C.) Manufacturing Company is under way, it is stated. Lawrence Construction Company, of Augusta, Ga., has the contract for construction work, and the finishing equipment will be furnished by H. W. Butterworth & Sons Company. J. E Sirrine & Company are the engineers in charge of construction. It is planned to start operations by March 1.

Belton Mills, Belton, S. C., will add 10 five-room cottages, to be erected by Minter Homes Company, of Greenville, S. C., in their village.

A property of 42 acres, adjoining the Winnsboro Mills, Winnsboro, S. C., has been purchased by Lockwood, Greene & Company, of Boston, for $20,000, but no statement has been made as to the purpose to which the property will be used.

Improvements, including re-construction work in the mill village, to entail an expenditure of about $20,000, are under way at the Ninety-Six Cotton Mill, Ninety-Six, S. C.

Calhoun Mills, Calhoun Falls, S. C., are adding a large number of houses for new operatives, in line with a development program in which extensive improvements and additions to the mill were recently completed.

A 400-hp. Universal uniflow engine has been installed by the Courtenay Mfg. Co., Newry, S. C., in addition to its 450-hp. cross-compound condensing engine.

The capacity of the Summerville Cotton Mills, at Summerville, Ga., manufacturers of cotton duck and osnaburgs, will be doubled by the completion of enlargement plans voted by the owners. In addition to the enlargement of the mill, a large number of employees' cottages will be built, work on which has already begun.

Bibb Manufacturing Company have purchased a large tract of land adjoining its properties in Columbus, Ga., which, it is understood, will be used to extend the village. The newly acquired property contains about 75 acres, and the purchase price was about $100,000.

Walter T. Candler has purchased, for The Lullwater Company, of Atlanta, Ga., of which he is the president, the properties of Couch Mills Co., Inc., at East Point and Thomson, Ga., and Greenville, S. C. It is understood that plans for the immediate operation of the plants by the new owners is under way.

Lockwood, Greene & Co., engineers, of Atlanta, Ga., and Boston, Mass., announce the incorporation of an unusual feature in the design of the new Stark Mills, now being erected at Hogansville, Ga., under their supervision. The central air conditioning apparatus is located at the top of the building directly over the spinning room instead of being located in the basement, which is the usual practice. The new location, it is stated, "effects a considerable saving in construction cost because the larger ducts which carry most of the conditioned air run a relatively short distance. A further saving is effected by the elimination of expensive construction in the basement to provide the necessary housing for the humidifying and washing equipment in that location."

Crown Cotton Mills, Dalton, Ga., have completed a one-story reinforced concrete addition to the plant.

Lanett Bleachery & Dye Works, Lanett, Alabama, has awarded contract for extensions approximating 34,500 square feet to the present plant, it is announced by H. R. Stephenson, vice-president and general manager. Present machinery will be re-arranged, and new dyeing and drying equipment added. J. E. Sirrine & Company are the engineers.

Extensive village improvements are being made by the Merrimack Manufacturing Company, Huntsville, Ala. Concrete sidewalks and guttering are being laid on 2½ miles of street in the new addition to the main village, where 70 six-room houses have been erected. The whole village is being renovated by carpenters and painters.

Work has begun on the construction of an addition to the Union Springs Cotton Mills, Union Springs, Ala., recently purchased by the Comer interests of Birmingham.

A new cotton mill is in prospect for Dadeville, Ala., a new company having been formed for the promotion of the organization. About sixty acres of land have been bought for the purpose, it is stated. Ernest Nelson is interested.

The work which Lockwood, Greene & Company, engineers, are doing for the Cotton Mill Products Company, of Jackson, Miss., consists of motorizing an engine-driven mill, and installing a new lighting system.

Stonewall (Miss.) Cotton Mills have enlarged the weaving department by the addition of 132 Draper looms. A new Barber-Colman warp-tying machine has also been installed.

The Jonesboro Cotton Mills, Inc., Jonesboro, Arkansas, will construct a 125 x 600-foot mill building with two 50 x 100 foot warehouses, in line with their announced plans for the establishment of a mill. About 75 operatives cottages will be erected also.

Another cotton mill for McKinney, Texas, seems certain as a result of efforts on the part of Dr. C. G. Comegys and others. The new mill company will be capitalized at $500,000, of which $300,000 will be raised locally.

The Lois Cotton Mills, Douglasville, Ga., have installed additional motors, completing their electrical equipment so that all the machinery is motor-driven.

The Philadelphia Division of the B. F. Sturtevant Company is now located at Thorne & Copewood Sts., Camden, N. J., in a modern daylight building, with Pennsylvania Railroad sidings, according to a recent announcement by the company. In this new location is maintained an up-to-date shop for manufacturing all kinds of sheet metal work required for the complete installation of fan systems including heating, ventilating, drying, exhaust and conveying work. A large stock of standard equipment such as electric propeller, monogram, and planing mill fans, steel pressure blowers, turbo undergate blowers, blast gates, etc., will also be carried.

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The New England Mill Situation.

Curtailment of production is very general throughout New England due to the high price of cotton and the lack of profit margin in the business offered. Some mills are unable to sell their products at any price within reason while others have sold moderately and are maintaining a semblance of working forces at work for a few days each week. Recent statistics of the cotton movement into New England show that purchases were made later than usual in the season and indicate that the mills are not at all well supplied with raw material. There are some exceptions where mills bought in July and August but they are rare.

The year's crop results are bearing heavily on those mills using particular staples or long staples. In a number of instances where manufacturers contracted for cotton deliveries, factors have been obliged to cancel because the kind of cotton bought has not been grown or cannot be procured. This is particularly true of some of the choice grades of long staples. While substitution in some degree is possible there are some mills making specialties that cannot use Egyptians without changing the character of the cloths wanted.

The New England manufacturing world is resigned to the belief that the crop shortage is real and that curtailment of some sort will be forced as the year goes on. Owing to the high prices already attained and the inability of merchants to secure prices in keeping with the high costs of cloths, the determination not to accumulate stocks is growing firmer each week. To date, buyers of cloths have not been much impressed by the probability that at some time the curtailed production will lessen the supply of goods. They appear to date to have been able to secure what they require and have not been bidding the market up to the higher levels now prevailing. Most of the advances have been the result of trying to protect mills on contract production after having disposed of stocks at low prices.

The Amoskeag Company closed its mills making cotton goods early last month and have reopened only parts of two of the eleven since. The demand for ginghams has been especially poor and it looks now as if a large part of the Spring business will be lost to many mills. Following a price reduction by one of the large southern mills, the Amoskeag Company reduced the price of one of its best known lines 2 cents a yard. The reduction was made about the time the market prices on other goods had started to rise. This action appeared for a time to unsettle buyers a great deal, but eventually they came forward and placed some orders.

Neither the Amoskeag nor the southern company that made the first revision downward after the season opened, have been able to overcome the inertia of buyers and the business done was too limited to warrant attempts in keeping gingham looms running. Some of the large mills in Maine engaged on ginghams are running three days a week, another large Massachusetts gingham mill is running three days a week every two weeks, and some other mills are operating short time in various ways. It would seem that ultimately this great curtailment of gingham production would bring about scarcity and a renewal of demand. Some merchants think that it has already begun because of the quickened distribution in jobbing channels. Others say the increased business heard of is being done at a loss based on the costs of replacement.

The large printers of percales recently advanced prices on percales 2 cents to 2½ cents a yard. They have secured a moderate business only, the best buying being done by southern and southwestern jobbers. The trade in some cases was well filled up with goods at low prices and it may be some time yet before the jobbers can be forced to advance their asking prices in keeping with the prices now current in agency circles. The Pacific print works has been running to 80 per cent capacity. Some other printers have been running in full but they contend that there is no profit in the business based upon current costs.

Most of the finishing plants have been operating to average capacity, ranging from 60 to 70 per cent. There are some plants running in full, a conspicuous instance being the great bleachery of the Pacific mills. The prices at which the company accepted bleached goods orders were so low that many converters have withdrawn temporarily at least from the converting of staples in bleached cottons, leaving the trade to the now largest handlers in the world. The immense bleachery of 80 kiers has been kept running in full for weeks and in some instances overtime is being worked in the effort to meet the sales.

Job printers have been running less than an average of 70 per cent and in some cases they have been running less than 50 per cent of capacity. This is due to the uncertainty of styles for spring and the unwillingness of converters to put goods in work so long as they are unable to secure replacement costs on finished goods. The finished goods end of the business has been lighter than the unfinished goods but the latter has been particularly light in Fall River and New Bedford. At Fall River some of the print cloth mills have been running to about 50 per cent capacity for several weeks while New Bedford mills are turning out less than 80 per cent of the capacity product in regular working hours.

Some mills that make wide sheetings are very busy. But where they have narrow looms they have been unable to secure a satisfactory business so that the condition exists in some sections where mills are running wide looms to capacity and narrow looms, 40 inches and under, are standing idle.

Some of the mills making bedspreads and towels are running short time, and mills making tire fabrics are running very light. Mills making trouserings, denims, tickings, and other heavy colored cottons are running part time in a number of instances. While employment opportunities are not at all numerous there is no possibility of inducing operatives to work on lower wage schedules under a promise of securing steadier work in that way.

The wash fabrics trade for spring has been peculiar. There has not been a normal demand for any of the better known staples. Flock dot voiles, that are now made freely, have sold very well while most styles of printed voiles have been quiet. There has been considerable business placed on fine dimities for underwear and waistings. High fancies in crepes and in ratine decorated goods have sold quite well and novelties of a sport character in cotton, silk and cotton, and other mixtures have sold. But none of these goods have been sold freely enough to keep mills well employed in full. Some mills specializing in silk and cotton

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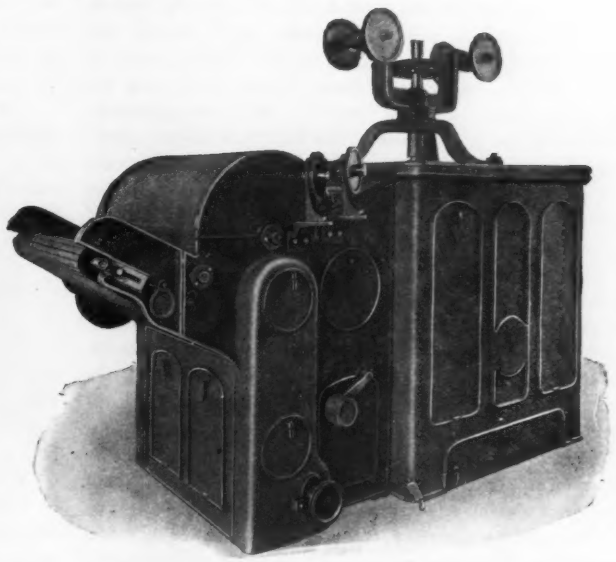

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novelties have done better than a year ago.

The annual mill meetings held in the past month throughout New England have disclosed most irregular conditions. Many mills were able in the first half of their financial year, say, running into April, to do enough business at a profit to warrant the payment of regular dividends. Others fell short and paid dividends out of surplus.

The singular fact is that some mills have paid handsome returns to their stockholders, even to the extent of declaring 25 per cent and 10 per cent extra dividends, while mills engaged on somewhat similar goods have barely maintained a small dividend. In Fall River, the disaffection led to four changes in management and other changes are talked of. It has also been noted that while many mill stocks have been offered, the market for them has been narrow, although, in a number of instances, the capitalization of the properties is barely $10 a spindle, perhaps a fifth of the actual cost of mill replacement today.

The talk of final decay of New England industries has lessened somewhat because of the vigor with which some mills are changing over the character of their output to fancy goods, or making renewed efforts to put more vigor into the merchandising of the products. The fact that such a very large share of New England capital has gone into the remarkable southern development this year appears to have little effect upon public sentiment about mill properties.

There is a great deal of discussion going on in mill circles concerning the probability of change on the part of the general public toward cotton goods values when the permanence of the cotton shortage is better understood. Among manufacturers it is felt that the boll weevil menace has been neglected by the public and the light cotton yields of recent years has been attributed largely to weather conditions. Most manufacturers are convinced that cotton goods may hold on a relatively high level for a long time, and they hope that after the cheap goods now in hand have been consumed the rise in prices in first hands will be a stronger influence toward passing the necessarily higher values along to consumers.

The decline in silk values recently has made it seem probable that fine cottons will suffer in comparison. In the heavy end of the industry, the relatively low prices of burlaps will do something toward making burlap substitutes for heavy cottons popular in some lines. But on the whole it is believed that on some of the plain goods there is a substantial overproduction for the limited demands now being evidenced and from this fact they seem to draw the conclusion that the passing of high prices along will be a slow process.

While the building of new cotton mill plants in New England has been negligible, it is the fact that expansion of the New England wool goods and worsted goods industry continues. A new Washington mill is now in operation at Lawrence, a part of the American Woolen Co. That company has also taken over the Slater properties at Webster, Mass., and will renew the plants. A number of French investors are building mills in Rhode Island. On the other hand, there are indications that plants built to supply special auto products will be discontinued and that it is not without probability that some of the fine cotton spinning machinery now installed in New England may find its way South where less onerous legislative and labor restrictions prevail.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, November 17th, 1923.

Since our review of last month, spot and contract values advanced about 600 points (6 cents per pound) or about $30.00 per bale, the rise in the market the past month representing half of the advance of 12 cents per pound, or $60.00 per bale, since the season opened August 1st. The enhancement of values during this short period of about 14 weeks has been as great as was the advance for the whole of last season, the "peak" of which was not reached until the spring, whereas prices today are already about ten cents per pound higher than they were at this time one year ago, and are about two cents higher than the highest levels reached last season, with the probability of higher prices still eventually.

This rapid change in the situation has been due mainly to the crop having been over-estimated in the early part of the season, to such an extent that the November 2nd government forecast was for a yield of only 10,248,000 bales vs. 11,015,000 on October 2nd, and prospects are that the final government crop estimate, set for December 12th, will likely be reduced to below 10,000,000 bales.

Since the last crop condition returns were made to the government, October 25th, very unfavorable wet, cold weather made its appearance in the cotton region, heavy to killing frosts occurring at many points in the interior, thereby lowering crop prospects all the more and damaging the grade further, reducing the size of the yield and lowering its quality.

As a result there has been a general further revision downward in private crop estimates of late, ranging from about 9,300,000 to 9,800,000 bales. Returns to the National Ginners' Association pointing to a production of only 9,320,000 bales, which is the lowest of crop forecasts issued so far.

That the trade has become very much exercised over the diminishing crop outlook, is noted in the big advance that has taken place of late and in the more urgent demand for the staple at the highest prices reached so far this season.

In explaining the rapidly diminishing prospects for the crop compared with two months ago, the Crop Reporting Board, Washington, issued a statement to the effect that the tentative abandonment in acreage this year was the greatest ever known—about 5.1 per cent. Such a percentage of abandonment from the estimated acreage planted —38,287,000 acres, would represent an abandonment of about 1,935,000 acres. The final report on acreage abandonment will not be issued by the U. S. Department of Agriculture until December 12th, when the final estimate of the crop will be released.

The Census Bureau reported only 7,555,000 bales ginned to November 1st, against 8,139,000 last year, and returns to the National Ginners' Association indicate only about 8,260,000 ginned to November 14th vs. 8,870,000 one year ago when 91.2 per cent of the crop was ginned last year. On the basis of the National Ginners' latest estimate as to ginnings, the output of the gins at this late date—November 14th—would be still 610,000 behind last season when the total ginnings for the whole season were only 9,729,000 bales.

In event of the crop turning out to be only about 9,500,000 bales of lint cotton and about 500,000 bales of linters, or a total of about 10,000,000, the trade will be face to face with the probability of an actual famine in American raw cotton, if not in other kinds as well, next summer, perhaps sooner, as the world consumed 12,631,000 bales of American cotton last season. On the basis of a crop, including linters, of about 10,000,000, plus last season's carry-over of American of 2,573,000, the total indicated supply of American for this season would be only about 12,573,000 bales, or less than the trade consumed of American last season.

For the moment, however, owing to prevailing high prices and the uncertainty of the European political situation, as well as the possibility of the crop now being under-estimated, just as it was over-estimated sometime ago, conservative brokers are advising caution pending future developments.

Discussion Meetings Renewed at Fall River.

It will be remembered that during last winter a series of discussion meetings were held at the Bradford-Durfee Textile School in Fall River, Mass., for the operating executives of the mills there, and that these meetings were reported in COTTON.

With the experience of that first series, the possibilities of such gatherings so presented themselves to those in charge of the work that it was decided to conduct another series during this winter and spring, in this instance planning a definite organization and classifying the various meetings. In this series there will be nine meetings in all, three of which will deal with subjects of general interest to all persons engaged in cotton manufacturing, and each of the six other meetings is to be considered as a sectional or departmental meeting, that is, the subject, or subjects, treated at any one of these meetings will be confined to one department of the mill, the informal discussion idea to be emphasized at the sectional meetings and the men urged to ask questions and discuss the subjects brought up.

The first meeting of this series was held on Wednesday evening, November 21. The speaker was James McDowell, of the Sharp Mfg. Co., New Bedford, who discussed the subject of "Cotton—Its Culture and Classification," his address being followed by a general discussion. This meeting will be reported complete in the January number of COTTON.

Other meetings will be held during the winter, and the subjects and speakers include: "Textile Research," by S. W. Stratton, president of the Massachusetts Institute of Technology; "The Advantage of a Filling Preparation to Spinning and Weaving Processes," by George W. Foster, Universal Winding So.; "Development of Textile Machinery in the Last Hundred Years," by E. Kent Swift, Whitin Machine Works; "Development of Looms in Cotton Manufacture," by F. W. Howe, Crompton & Knowles Loom Works; "How Cloths are Finished," by Albert R. White, Mount Hope Finishing Co. The series will close on April 2nd, and interspersed with the general meetings will be the discussion on carding, spinning, warp preparation, weaving, etc. The meetings will be conducted under the auspices of the Associated Industries of Massachusetts, as was the previous series.

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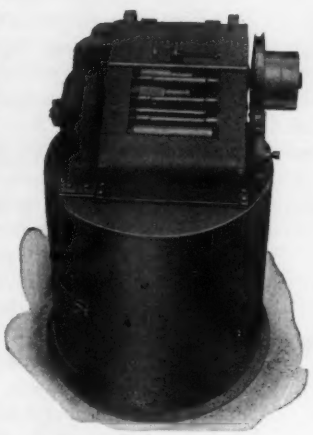

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Notes About Men You Know.

JAMES H. MAXWELL, southern representative for the Keever Starch Company, died at his home in Greenville, S. C., on Tuesday, November 6th.

Captain Maxwell was one of the best known and most popular members of the selling fraternity of the southern textile field. He had been connected with the Keever company for many years, and had endeared himself to a great host of friends in the industry. He was 70 years of age at the time of his death.

J. T. PHILLIPS has been promoted from overseer of spinning to superintendent of the Loray Division, Manville-Jenckes Company, Gastonia, N. C.

R. C. BUNCH has resigned as manager of the Queen Knitting Mills, Statesville, N. C., effective October 15. His successor is Fred Guerrant, of South Pittsburgh, Tenn., a hosiery manufacturer of 20 years' experience.

R. E. BARNWELL, resident manager of Lockwood, Greene & Company, whose main southern offices have been removed to Spartanburg, S. C., was elected a member of the executive committee of the Cotton Manufacturers' Association of South Carolina at the recent meeting of the organization.

H. A. LIGON, JR., was recently elected president of the Arcadia Mills, Spartanburg, S. C., to succeed his father, who retires. W. P. Ligon succeeds H. A. Ligon, Jr., as vice-president.

G. L. CHAPMAN has been made superintendent of the Woodstock Cotton Mills, Anniston, Ala.

W. S. MOORE has become overseer of carding and spinning at the Cheraw Cotton Mills, Cheraw, S. C.

E. B. BRANNON has become overseer of spinning at the Hampshire Spinning Company, Clover, S. C. He formerly held a similar position at the No. 1 Mill of the Chadwick-Hoskins Company, Charlotte, N. C.

S. A. DILLARD has been made general superintendent of the Martel Mills, Inc., with plants at Columbia, Lexington, and Irene, S. C., and has removed his residence to Lexington.

L. W. WALTER has been promoted to overseer of spinning at the No. 1 Mill of the Chadwick-Hoskins Company, Charlotte, N. C., succeeding E. B. Brannon.

P. A. SMITH, who has been overseer of spinning at the Olympia Plant of the Pacific Mills, at Columbia, S. C., will be the superintendent of the cotton mill of the Lyman Division, which is being built near Wellford, S. C., and of which Leonard C. Little will be the agent.

H. C. MOORE has become night superintendent of the Union-Buffalo Mills Company plant at Buffalo, S. C.

H. R. STIREWALK has become overseer of spinning at the Blue Ridge Cotton Mills, Connelly Springs, N. C.

W. R. SUIT has become overseer of spinning at the Mary-Louise Mills, Mayo, S. C.

R. Z. LYTTON has become general superintendent of the Ragan Spinning Company, Ragan, N. C., which is constructing a plant near Gastonia, N. C.

S. W. ANDREWS has been made overseer of twisting at the Steel's Mills, Lenoir, N. C.

J. E. WRIGHT has resigned as superintendent of the Excell Mfg. Company, Lincolnton, N. C., to become general superintendent of the Morgan Cotton Mills Company, Laurel Hill, N. C.

W. FRANK SMITH, master mechanic at the Lynchburg Division of the Consolidated Textile Corporation, Lynchburg, Va., died suddenly on October 29th. Mr. Smith had been at Lynchburg for the past six years, going there from Lindale, Ga., where he was connected with the Massachusetts Cotton Mills, and ranked high in his profession. He leaves a host of friends throughout the South. Surviving him are his mother, Mrs. Amanda A. Smith, of Chattanooga; one brother, one sister, a daughter, Mrs. Gladys Batson, of Lynchburg; two sons, Lee and Frank, Jr., of Danville. The remains were interred at Dalton, Ga., on November 1st, with Masonic honors.

T. P. RICHARDSON, JR., of Gastonia, N. C., has become connected with the Carolina Brush Company, of Charlotte, N. C., and will represent them in North and South Carolina.

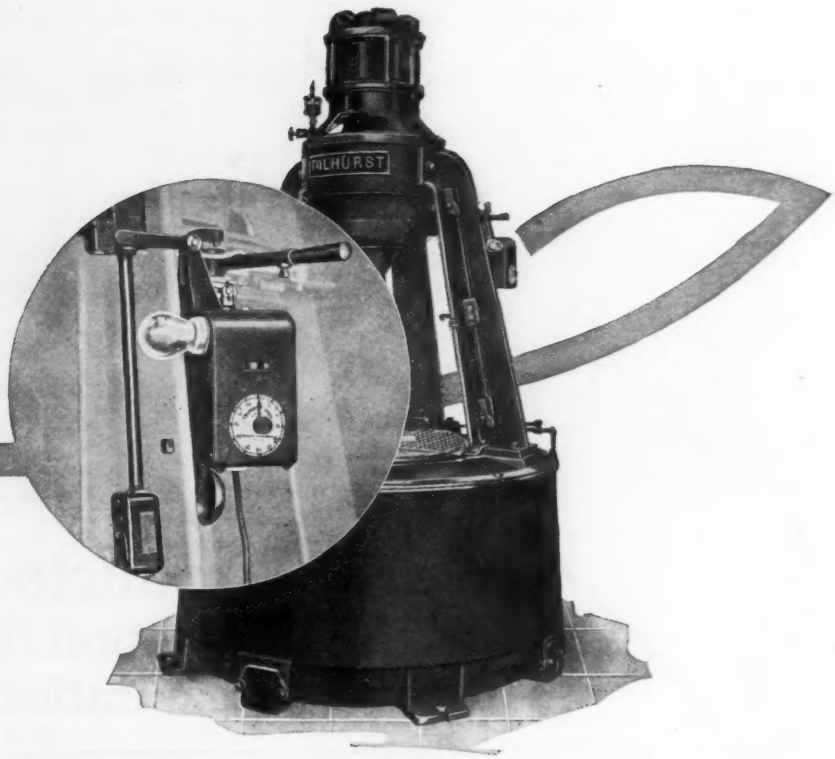
O. M. PETERS, formerly superintendent of the Gaudalupe Valley Cotton Mills, Cuero, Texas, recently resigned on account of ill health, and Jake Wilson, formerly overseer of weaving at Sherman, Texas, has accepted the position succeeding Mr. Peters.

T. A. NICHOLS is superintendent of the Demopolis Mills, Shortleaf, Ala., with R. S. Rutherford overseer of carding, Ira Bishop overseer of spinning, and J. E. Copeland, master mechanic.

SPENCER TANNER, aged 22, son of S. B. Tanner, and brother of Kenneth S. Tanner, was killed in an automobile accident occurring near Charlotte on the night of November 3rd.

ALBERT D. JOHNSON, secretary-treasurer of the Diamond Chain and Manufacturing Company, Indianapolis, Indiana, died suddenly Thursday, November 1st. He was born 58 years ago in Greencastle, Indiana. In the early bicycle days Mr. Johnson was associated with C. F. Smith, of Waverly bicycle fame. In 1889 he joined with L. M. Wainwright in organizing the Central Cycle Company, makers of Ben Hur bicycles. When the Diamond Chain and Manufacturing Company was organized in 1905, Mr. Johnson became secretary and treasurer, which position he retained up to the time of his death. He was an important member of the organization, and beloved and respected by all his associates. In his passing the chain industry loses a man who for many years has been closely associated with and deeply interested in the development of the industry.

B. C. GETSINGER, district manager of the Bureau of Foreign and Domestic Commerce for the Southeast, with headquarters in Atlanta, Ga., has been appointed executive secretary of the South Atlantic States Association. Mr. Getsinger will serve in this new capacity in addition to his connection with the government, his work in the new position being supplemental to that of his present office and of a broad, educational nature that is believed will add strong momentum to the efforts of the federal government to develop the foreign trade of the section, which is the purpose of the organization.



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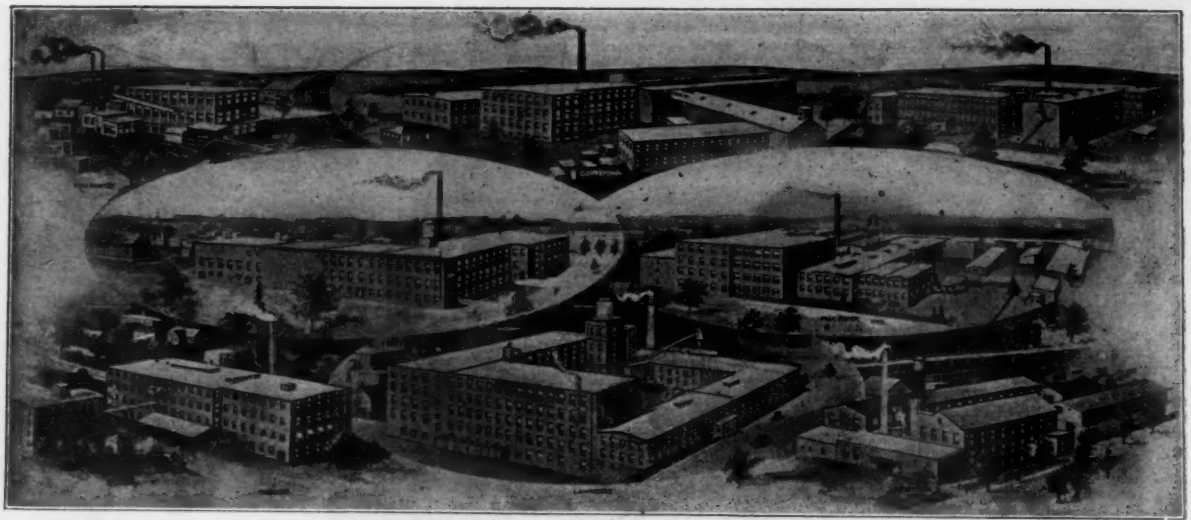

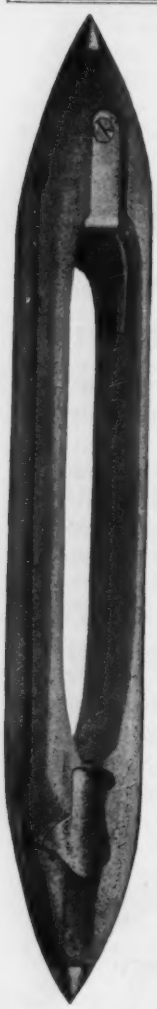

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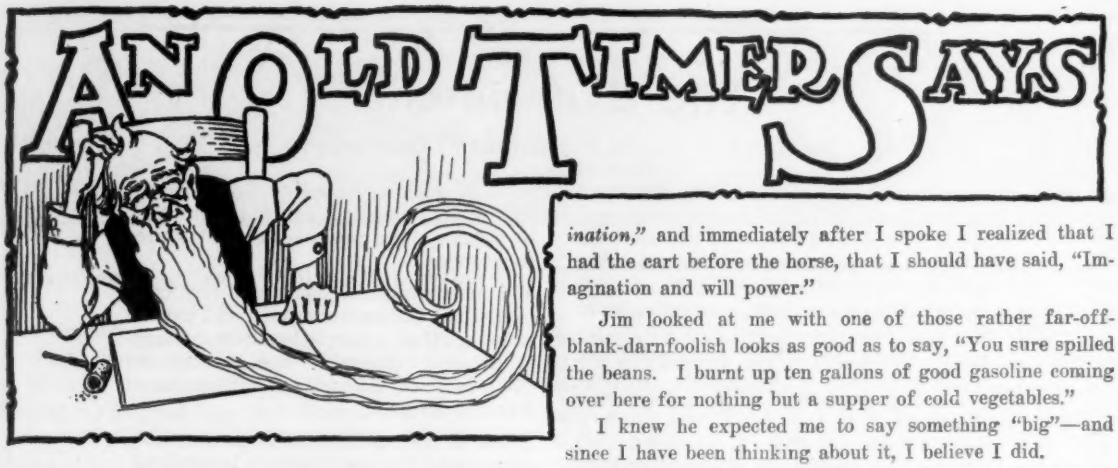

My old friend Jim came to see me the other day. You remember Jim, I'm sure, but in case you care to refresh your memory, pick up your March number of COTTON and look over my article again. Of course you have the March number and all the other numbers, or *you should have!* As you read COTTON, if you will just make a note on the back page, or any blank place, of the articles that you have reason to believe you would like to refer to some time, then file all your copies away, you will build up information that will beat most of the textbooks a city block. Because practically all the information in COTTON is based on the practical experience of overseers and superintendents; and many of these experiences it has taken a lifetime to acquire.

Darn! I'm as bad as some preachers, starting out to tell you something and winding up on something absolutely different.

What I started to tell you about was the visit from my old friend Jim. You know, he took right to heart those articles "Old-Timer" wrote about his card room; and he carried the same reasoning right along when he was promoted and up to the time he asked me for the weave room calculations. He asked me a bushel of questions about those weave room calculations until I really think he knows more about what I was trying to say than I know myself.

Well, anyway, he showed his superintendent that he did know something about a weave room if he had been in a card room practically all his life. Yes, sir, I am glad to tell you Jim has been promoted to a better job than I ever thought he would get—but never mind that, I'll tell you about Jim's new job some other time. What I started to say was (I believe this is the second time I have started)—

After supper Jim and I slipped off to ourselves where we could smoke and talk. I say "smoke," but really Jim "chaws" most of the time—that is, when there's no company around. Jim says, " 'Old-Timer', I've had something on my mind for several weeks, and I drove all the way over here to ask your opinion about it."

I thought probably he had some "nitty" sliver coming from his cards, or some thin places in his yarn, or some other darn fool thing cotton mill men are always having, so I filled up the old pipe again and told him to "shoot."

So Jim rather surprised me with this question: "What, in your opinion, are the outstanding qualities that make for success in most men?"

Well, right off the bat I replied, "*Will power and imagination,*" and immediately after I spoke I realized that I had the cart before the horse, that I should have said, "Imagination and will power."

Jim looked at me with one of those rather far-off-blank-darnfoolish looks as good as to say, "You sure spilled the beans. I burnt up ten gallons of good gasoline coming over here for nothing but a supper of cold vegetables."

I knew he expected me to say something "big"—and since I have been thinking about it, I believe I did.

At any rate, that look of Jim's told me I had to try to explain myself.

"Jim," I asked, "When you were a kid did you ever ride a stick and imagine it was one of those fine horses you had seen in town? Did you ever tie a string to two of the boys and imagine you were Mr. So-and-so and could you see that fine house and other things you were going to have when you grew up to be a man? And then as the years slipped by and your Dad got you a job learning to spin, remember, Jim, how you looked forward to the time when they would put you to doffing—how you would hurry back from dinner just to have the chance to go sailing across the spare floor with one of the doffer's boxes? And then when you did get a box, how your imagination carried you on to the time when you would put on long pants and be a section man? Gosh! How you would make those spinners stand around!

"Yes, I know, Jim, you ran a section a long time, but you made one of the best section men I ever saw. That's why the 'super' carried you down to the card room to learn to grind—he wanted a man he could trust to set those cards like he told him.

"And well do I remember how you and I would sit down on the river bank Sunday afternoons and talk about what we would do when we got to be overseers. That was our imagination carrying us along, Jim; but let me tell you one thing: that imagination would not have been worth a darn if you had not had the *will power* to make those dreams come true!

"All the imagination in the world would not have done you any good if you had not had that bull-dog determination to keep persistently at it, to ever keep fresh in your mind that you were going to 'beat the other fellow,' were going to win out. **Imagination precedes and is the direct cause of all achievement.**

"All the improvement in the world we owe chiefly to man's imagination backed up with a strong will power to carry through the things which are born in the mind.

"We would still be sucking shuttles, grinding old stationary flat cards, tieing chicken head knots, measuring cloth by hanging it on two sticks on the wall and hauling it to the depot with an old mule, if men hadn't had imagination.

"Dreamers are often looked upon as cranks, but any

(*Continued on page* 145.)

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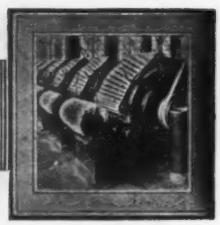

Ths Question Contains No Details But—What Do You Think?

EDITOR COTTON:

I would like to ask this question in the "How Other Men Manage" department of COTTON: If I change the weight of my finished laps from 15 ounces to 30 ounces, and the draft on the card from 109 to 218, will this make a stronger yarn or not? I know of one mill where this change was made, and they say that the yarn broke two to four pounds stronger. I would like to hear from some of the "old-timers" on this question. A. L. J. (S. C.)

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Some Advantages of Filling Wind.

EDITOR COTTON:

Perhaps this letter will answer some of the questions that "Filling Wind (Ga.)" asks in the October number of COTTON, by giving the particulars of the change from warp to filling wind in one mill that runs 40s to 65s yarn.

In the first place, more yards were put on a bobbin with the filling wind. We had been using a warp bobbin 7/8 inch in diameter and 7¼ inches long. When we made the change we dropped the spindle rail so we could get about an inch more lift and so tried using a filling bobbin 7/8 inch x 8¼ inches. After some experimenting we reduced the size of the bobbin to ¾ inch, and as the work seemed to run first rate, this 8¼ x ¾ bobbin was adopted as standard. This new bobbin has a filling cone on the bottom which is 1 1/16 inch at the base, and tapers down to the ¾ inch which is the size of the barrel of the bobbin. The cone reduces the strain in starting up when the amount of yarn on the bobbin is small.

On our warp wind we were putting 3,500 yards of 40s on a bobbin. With the filling wind we put on 4,500 yards and might possibly do more by changing the lifting speed of the rail so as to make less taper at the heel of the bobbin. This increase in yards per bobbin has been the chief advantage derived from the change, as it has so lessened the work of doffing that we have laid off one-fourth of the doffers we formerly had, and the remaining ones do not have to work so hard.

But that is not the only advantage by any means. We have increased the front roll speed five turns per minute on 40s, which gives quite a difference in production. We have been able to run a traveler that is heavier by one number. We get yarn which seems to me to be less fuzzy due to less slapping on the separators.

I have not noticed that the breaking strength was altered either way by the change, but it is entirely possible that if we had not increased speed and consequently taken out twist, our yarn might break better, but as it is it has at least not become any weaker.

There has been no difference in the amount of waste made nor in the number of ends breaking down in spinning, so we have not increased the number of sides per spinner.

In the spooling room we have been able to more than double the speed of the spindles and get off so much more work that we have stopped a number of spooling frames. The cost of spooling has dropped very considerably since we made the change, because of the increased spindle speed, which has enabled us to reduce the piece rate per pound on spooling in addition to the saving in overhead accomplished by using fewer frames. Bud (Mass.)

A Brusher Suggestion.

EDITOR COTTON:

Allow me to commend the excellent article by T. T. M. (N. C.) entitled "Points on Brushing and Rolling" which appears in the How Other Men Manage department of the October issue of COTTON. I agree with him in that the brusher, usually, seems to be the red headed orphan child of the average mill, with no one to look after it or care whether any one else does. Furthermore, it seems to be a hard job to instill into the average help the idea that cleaning off the wire brushes and cleaning out the whole thing generally will make any improvement in the final appearance of the cloth. They seem to think that running the goods through the brusher is a sort of unpleasant duty to be done as quickly as possible and that any kind of way will do.

This article set me to thinking about something that I have frittered away a good deal of valuable gray matter over (valuable because scarce) and I want "T. T. M." to think it over and tell me if he knows why a cloth brusher has a fan in the bottom of the machine to carry away the lint that the brushes get from the bottom side of the cloth and no fan in the top to take away the lint that comes from the top side of the cloth. There may be brushers so equipped, but I have never seen one.

"T. T. M." says "one of the hardest things I have encountered in connection with these machines is to get the operator to keep the stripping box for the top roll clean.

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This box will fill with lint and strings very rapidly, and when too full this lint will be drawn by the force of the fan underneath and pass out of the machine in great lumps on the goods." Very true. But why a stripping box for the top roll? Why not a fan to carry off the lint instead of a box to catch it? Why hold it in the machine until it spills over on the cloth and causes trouble?

In a gingham mill with which I was recently connected we had that trouble and the lint that came over in bunches on the face of the cloth would be carried on into the starch mangle and then through the calender with the result that it was glued to the face of the goods and had to be picked off by the inspectors. Naturally the general excellence of the finish suffered. Out of odds and ends around the place I had constructed a sheet iron hood which came down to the top side of the cloth just before it left the brusher. To do this we simply replaced one of the doors on top of the brusher with this hood and to the hood we connected a small exhaust fan. The whole thing was a hastily constructed experiment but it caught the bunches of lint before they got out of the brusher and eliminated that trouble. Now don't anybody get up and say I could have avoided that trouble by having the brusher kept clean. I know that as well as anybody, but once in a while when it wasn't done properly the fan saved the day.

The machine builders must certainly have thought of this. Why haven't they adopted it? There must be some reason! The argument probably would be that one fan would interfere with the other; that one little current of air could not go two ways at the same time, or something along that line, but I didn't have any trouble with mine. Everybody that saw it agreed that it was a good scheme, but still they all looked at me as if they thought I was sort of foolish. Will "T. T. M." or someone else tell me why?

Quidnunc (S. C.)

What is the Trouble With These Looms?

EDITOR COTTON:

I would like to know the proper weight of balance wheel to run on the line shaft in my weave room, if any.

Here are our conditions: We have eighty 40-inch E Model Draper looms belted to a shaft using 40 straight belts and 40 crossed belts. We have a balance wheel on the end of the line shaft, but I do not know the weight. Our looms are run at 160 picks per minute. We have steam power and the speed at the engine is very regular. This is the condition in our No. 1 Mill.

In our No. 2 Mill we have 41 looms of the same style and speed belted to another line shaft, which is equipped with the same weight balance wheel as in the former case, and get good even running looms.

The machinery upkeep in the No. 1 Mill is 50 per cent higher with everything else equal, and the sections are at least 50 per cent harder to run than in the No. 2 Mill. The looms in the No. 1 Mill run with a jerky motion and slam without any apparent cause. I have run both rooms with the same system and have changed fixers from one room to the other without any apparent improvement. I have come to the conclusion that it is our long line shaft without sufficient balance wheel momentum to overcome the alternating load of the loom. I would like to hear from some men who have had experience along this line.

F. C. J. (S. C.)

EDITOR COTTON:

Replying to "F. C. J.," I suggest that, as a certain weight of flywheel in the No. 2 Mill is sufficient for 41 looms and is not sufficient for 80 looms in the No. 1 Mill, it indicates that the weight of the present flywheel in No. 1 Mill should be considerably increased, possibly doubled, since the speed is the same in both cases. When the speed anl the mean diameter of a flywheel rim remain the same, the effect of the wheel will vary directly as the weight in the rim. As the weight of the rim of wheels now used is not known it is not practicable to give the weight in pounds needed in the rim of the wheel for No. 1 Mill.

If a new wheel is to be cast by a local foundry and the size of the rim doubled or thereabout, attention should be given to the arms, which may need enlarging also, in order to be safe. The stress in the rim and arms of a wheel varies with the weight and with the *square* of the velocity of the rim. Thus the stress in the arms increases very much faster than the velocity of the rim, and ample strength must be provided for such variations in the speed as are likely to occur. The rim velocity is found by multiplying 3.1416 by the mean diameter of the rim, in feet, and by the revolutions per minute. The mean diameter of the new wheel, should one be made, should be exactly the same as the mean diameter of the wheels, that is, the rims now in use.

Apprentice (Ga.)

Clothing Cards.

EDITOR COTTON:

In October COTTON, commenting upon an article by me in the August issue, "E. A. G. (N. H.)" asks me if I actually do clothe my cards the way I described, or whether I was taught that method in a textile school.

The answer can be found in more than 400 cards now running, from Texas to Maine, that were erected and clothed by me as a fitter for two of the foremost machinery builders in America. Now I have no quarrel with textile schools. I hold a diploma given through correspondence by one of the best, and as a result, together with a long practical experience, have been awarded, in two very important textile contests, first and second prizes, respectively, so be assured that I have no hard feelings.

"E. A. G." says he read my article several times, but from his comments I take it that he does not understand the method, so I will endeavor to sketch this taper cutting and prove it by figures, for I agree with COTTON in its practice of going to the bottom of things. "E. A. G." says he learned how to clothe cards from books, and also states that he is a textile school graduate. Well, he has a comeback for his teacher, for there is a vast difference in a row of card fillet and a rib. Eight rib, two-inch fillet means just what the term implies—eight ribs wide and contains 24 rows of wire, three rows per rib.

In following my present description, I should like for the reader to refer again to the eighth paragraph in my article in August COTTON, and also study the accompanying sketch; it is thus: cut in the center 75 inches and pull

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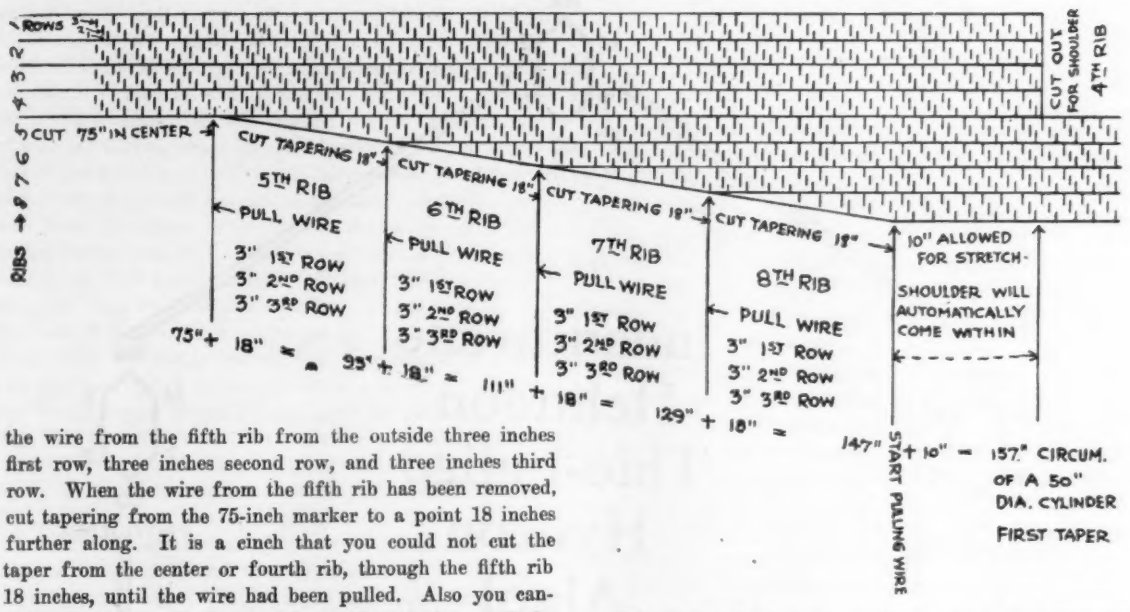
ROWS
RIBS
CUT 75" IN CENTER
CUT TAPERING 18"
5TH RIB
PULL WIRE
3" 1ST ROW
3" 2ND ROW
3" 3RD ROW
6TH RIB
7TH RIB
8TH RIB
CUT OUT FOR SHOULDER 4TH RIB
10" ALLOWED FOR STRETCH
SHOULDER WILL AUTOMATICALLY COME WITHIN
75" + 18" = 93" + 18" = 111" + 18" = 129" + 18" = 147" + 10" = 157" CIRCUM. OF A 50" DIA. CYLINDER
START PULLING WIRE
FIRST TAPER

the wire from the fifth rib from the outside three inches first row, three inches second row, and three inches third row. When the wire from the fifth rib has been removed, cut tapering from the 75-inch marker to a point 18 inches further along. It is a cinch that you could not cut the taper from the center or fourth rib, through the fifth rib 18 inches, until the wire had been pulled. Also you cannot pull the wire in the second row three inches until the wire in the first row has been removed three inches, and as I stated, to pull the wire three inches in the third row, this automatically puts the second row of wire in the fifth rib at a point six inches from the 18-inch marker or 12 inches from where the entire fifth rib is removed to the 75-inch marker. Perhaps I could have been a little more explicit by stating: set back six inches at the fifth rib and so on at each 18-inch marker until the fillet obtains full width. When I study the various articles in COTTON I do so to learn something to advance my knowledge, and as a contributor I have the same feeling toward others, especially those of less experience, for we are not all experts at the game.

In direct answer to the question whether I do clothe my cards in this way—I have four ways of cutting fillet tapers and the results are all the same. My personal method I will give but do not recommend to one just starting out to clothe cards.

When I said in the August number that I considered the method there described the best way for a beginner, and if followed would not lead him astray, I naturally assumed that the reader had some knowledge of cards and fillets to try to clothe, and should pull the wire, commencing at the 18-inch marker on the fifth rib (first row) in the direction of the short end of the fillet at the right-hand side, facing back of fillet. This, of course, will be against the knee and does not pull so easily as when with the knee, but will act as an incentive to a learner to find out other methods and cause him to be careful when pulling his wire for close fitting tapers.

As the entire operation of clothing was only touched in high spots in the August issue I will now give my system in detail, and not merely say to the learner to cut fillets to fit and use no measurements.

"E. A. G." says that a grinder once refused to start a card after he (E. A. G.) had set it, because he thought the flats would fly off. Does "E. A. G." know that the best clothing makers guarantee fillets at 40 pounds pressure to the rib?

For cutting the first taper of a two-inch card fillet, 50-inch diameter cylinder, measure 12 feet 3 inches from the end of the fillet to be applied to the cylinder from the front of the card, and set back six inches in the direction of the short end of the fillet, and pull wire from the entire eighth rib 12 inches. Then set back another six inches and pull wire from the seventh rib 12 inches. Set back six inches and pull wire from the fifth rib 12 inches. This occurs on the center of the fillet at a point 75 inches from the short end of the fillet. Now return to the 12 feet 3 inches length looking at the back of the fillet, and pull the wire in the first row of the eighth rib six inches on the right-hand side in the direction of the short end of the fillet. Then drop off three inches and pull the wire in the second row of the eighth rib three inches and so on at the seventh, sixth and fifth ribs. Begin cutting at the 12-foot 3-inch mark, with the face of the fillet up, and continue until the center of the fillet has been reached, being careful to cut to 1/16th to 1/32nd of an inch from the wire at all rows. Cut in center 75 inches to the end of the fillet, using a long board to lay off first taper and for cutting.

When the shoulder has been made fast to the plugs for the second taper, the fillet is again reduced to four ribs. Measure 17 inches from the shoulder and set back six inches in the fifth rib; pull the first row of wire six inches, second row three inches, and continue at the 17-inch marker on the sixth, seventh and eighth ribs to set back six inches and pull wire as stated, and cut tapering from center or fourth to eighth rib; make taper of long angle to avoid sharp cuts or breaks in the clothing.

Tension has been released and sufficient fillet pulled forward for this second taper, and is now pulled back and tension applied at 150 to 175 pounds, increasing with each additional rib as it takes the cylinder to 400 pounds, when full width obtains. If the fillet will not stand this pressure, it certainly will not go on my cards; and I do not recall ever having broken but one tail-end.

After adjusting the traverse of the mounting machine to correspond with the fillet entering on the cylinder, the fillet is wound spirally to the right-hand side of the card,

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with a steady pull and no stops, if possible, until within 3½ inches of the extreme edge of the cylinder, when the width of the fillet is carefully measured and a point on the cylinder is located to take 12 ribs and allow ⅛-inch cylinder surface exposed on the selvage. When the first row of wire is removed, about 12 or 15 inches on the right-hand side of the first rib, then drop off three inches and pull the wire from the second row and drop three inches and pull wire from third row. This removes the entire rib as far as you care to pull wire. The cylinder is then moved over until a point on the cylinder is located ¼ inch or one rib narrower than the first measurement and the wire in the first row of the second rib is pulled 12 or 15 inches, drop three inches and pull the second row, drop three inches and pull the third row in the second rib, and so on at the third and fourth ribs. Measuring to locate on cylinder where fillet must diminish at a corresponding point for pulling wire, until the fourth rib is reached. When the plugs are located at best advantage for a neat job, with tension at 350 to 375 pounds, the shoulder is made fast with four tacks (note the foundation has not been cut at this point, only the wire pulled) and with approximately ⅛ inch exposed cylinder edge. Only four or five tacks have been driven at intervals, sufficient to hold the tension applied. Cylinder is now moved over and measurement made of the space the fillet must occupy, plus ⅛ inch, and the first row of wire in the first rib at the left-hand side is removed. Then drop three inches and the second row is removed, and drop three inches and the third row is removed, and so on until the fillet has been reduced to four ribs, and cut as applied to cylinder, as the opposite or third taper, begins to show up; this is cut away as the last and finishing taper is being applied with pressure kept at approximately 40 pounds to the rib.

The majority of good carders are fussy about tight tail-ends. For best results when clothing, the fillets should be opened up and allowed to stand in a room at or near the same temperature at which they are to be applied for eight or ten hours. In all cases fillet is pulled on the cylinder and let stand from two to twelve hours, as time permits, then removed and the first taper cut and made fast on the selvage as applied, but no tacks are driven in cross row plugs for several hours to allow the fillet to creep before tacking. A short board or some blunt instrument is used while laying the fillet to gently tap up the spirals, being careful to avoid crowding the clothing which will feel very rough when the hand is passed over the wire. In this event, as pointed out in August COTTON, I never use the drum or solid grinder after clothing, and only ten cards are ground with a set of emery on the traverse grinder, regardless of the apparent good condition of the emery, the cutting qualities are gone after that time. I use black lead or a good stove polish on the back of the fillet and have the wire rubbed up to foundation over a rounding surface.

W. V. J. (N. C.)

JOHN W. LONG has resigned as superintendent of the Oakboro (N. C.) Cotton Mills Company to accept the general superintendency of the Clover (S. C.) Mills Company.

B. M. ROGERS, formerly overseer of carding and combing at the Clover (S. C.) Mills Company, has become superintendent of the Oakboro (N. C.) Cotton Mills Company.

Uneven Yarn.

EDITOR COTTON:

As we read the June issue we see several answers to the most vital subject pertaining to cotton manufacturing. The splendid articles by "A. D. (N. C.)" and "U. D. (Ala.)" are worth reading twice. These men know their business and should be holding down good jobs. Please note what "U. D." says in his seventh paragraph: "These 'long draft boys' that have been writing to COTTON are welcome to try it in their mills; but as for me and mine, short draft now and forever."

The art of drafting is the basis of the success of every cotton mill, and too often receives very little consideration. All mill men who believe in long draft should know that over-drafting is very detrimental to the strand in process; first, because it makes the strand uneven in places; and second, when the twist is inserted in the strand, the largest amount of twist per inch is found in the light places in the yarn, giving the yarn a still more uneven appearance, and third, it shortens the length of the strand.

All practical mill men agree that there is always some friction on a leather-covered roll, even if a mill has a very light drawing sliver to begin with. If the length of a light finished drawing sliver is shortened at each process by the friction, then the length of the heavy finished drawing must be shortened still more. This friction is not felt much on the process where no twist is inserted, but on a speeder, spinning frame and mule the thread itself shows this defect.

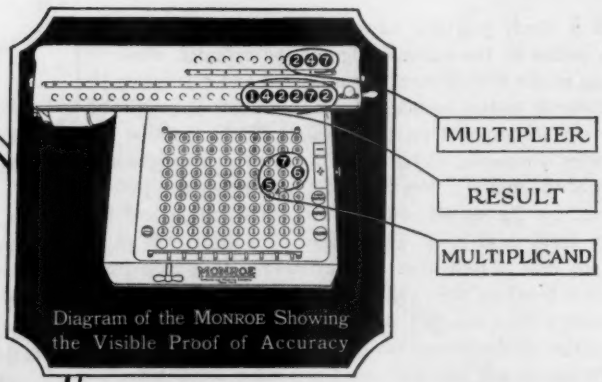
Please let me repeat here that on a speeder the surface speed of the front roll and the excess speed of the bobbin over the flyer should be equal, or, in other words, must be made to retard, so that its surface speed will be equal to the surface speed of the front roll. In such a condition, the bobbin winds on just as much roving as is delivered by the front roll. When a front leather-covered roll is over-drafting the friction is great because if the strand is too bulky, it is a dual operation between the front roll pulling the proper amount of fibers from the second roll, and the fibers offering enough resistance to cause friction on the front roll. Any retardation of the front top leather roll in turn creates a dual operation between the bite of the drawing rolls and the termination of the presser pad.

When the strand is shortened the relationship of the surface speed of the front roll and that of the bobbin is destroyed.

Most contributors will say that the foregoing is old stuff, which is true, but what I am unable to understand is this:

I hardly ever visit a cotton mill office without getting a glance of a copy of COTTON on some desk. Then I am ushered into the mill, and find 66 grain sliver on the cards, 75 grain finished drawing sliver, .45 hank slubbing, 1.25 hank intermediate roving, and a jump to 5 hank fine roving. Then I am taken to the spinning room and am told that the work runs very uneven, and that no matter what they do they have yet to find the right remedy.

In such a case, I say nothing, for I know I am up against one of those "long draft boys." Wash (R. I.)



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O-12-23

An Old-Timer Says—

(*Continued from page* 135.)

man who accomplishes anything worthwhile is a dreamer. Ford could imagine a low-priced car that the multitudes would buy; he had the will power to stick to that imagination in spite of all the persuading his advisors did to try to get him to build a more expensive car.

"Imagination and will power made him the richest man in the world.

"Imagination caused Northrop to build a bobbin-changing loom that revolutionized weaving—and so on throughout the whole history of all the processes we have had in cotton mill work.

"The most successful overseers and superintendents are men who have been able to vision a better way to do things, to operate machinery, and then keep persistently and everlastingly dogging at the idea until they accomplish it. The dictionary says the word "will" means strong determination, practical enthusiasm, energy of character.

"For goodness sake, Jim, why don't more of our brother overseers and superintendents have more 'will power'"?

I thought Jim had gone to sleep but when I called his name he straightened up, spat such a mouth full at the fire he put it completely out, and said:

"Well, 'Old-Timer', them sure are two big words and I believe I kinda catch your drift. At any rate I don't regret that ten gallons of gas I used in coming over.

"Good night."

Troubles in Finishing.

EDITOR COTTON:

We have been working on some heavy four-yard sheeting for bleaching and mercerizing and finishing into imitation linen goods. We have been having trouble all around; the mercerizing comes out uneven and the linen finish is not good; it looked fairly well but did not have the feel. We have been mercerizing the goods in the grey before boiling and in the finishing we have been starching the goods with 50 pounds of corn starch, 75 pounds of potato, 18 pounds of softener and the necessary blueing for 100 gallons of size. These goods were then dried and calendered on the chasing calender. We would like to hear through your "How Other Men Manage" department where we are wrong and how we ought to proceed. J. R. (N. Y.)

EDITOR COTTON:

I would say in answer to "J. R.'s" query that he will find it to his advantage to boil the goods for ten hours (that is, after steeping overnight) in caustic soda, using 130 pounds caustic to a three-ton kier and carrying a pressure of 12 to 15 pounds. After boiling, the goods must be washed well and dried and *then* mercerized, they are then boiled again as before, and bleached and finished.

In the finishing the right finish and feel can be secured by giving the goods 170 pounds of white dextrin and 20 pounds of softener for 100 gallons of size. They may then be well sprinkled (after drying and cooling off) and finished on the heavy chasing calender or by jacking, or by beetling, the beetling process being the best.

I give herewith another recipe, a foreign one, for imitation linen on cotton goods which is in general use abroad:

29 pounds potato starch (corn will answer but must be boiled longer).
22 pounds China clay.
3¼ pounds white soap.
1¼ pounds white wax (spermacetti).
1 pound tallow.
7 pints glycerine, 28 degrees Baume.

This should make about 26 gallons of size and should be used warm. Starch the goods through the starch on a three-bowel mangle—two wood and one brass bowl. Dry on a tenter so that the threads will be straight. Cool off and sprinkle; let the goods lie one hour. Calender through the friction calender on both sides, then mangle through a Dutch mangle four times and make up.

In the foregoing process, a Dutch mangle may not be available, as I have only seen one in this country and that was long years ago, but it will be possible to get nearly the same result by damping the goods well, then calendering (hot and heavy) on both sides on a five-bowled calender, and then while still damp chasing three or four times on the heavy chasing calender, or beetling; beetling is best.

W. B. (Maine)

A Word of Advice to College Men.

EDITOR COTTON:

When your friend "H. E. R. (Mass.)" expressed his ideas about textile school graduates in your July issue, he opened a subject of increasing daily importance to every worker and thinker in our textile industry.

Along with the advent of wireless, radio, aviation and the remarkable strides which our industrial life has taken, the present generation should be remembered for its success in combining education with shop and mill experience.

I take it for granted that a discussion of "A Square Deal" should have four equal sides. Most of all, it should have depth.

There is a side I believe which has not been clearly seen by "H. E. R. (Mass.)" or "A. B. (Ga.)" or the several other wide-awake contributors who are trying to get at the heart of things. If we examine this side, which heretofore has been hidden from view, we find the word "Service."

You must feed and water a cow if you want her to give milk. You can't be a successful mill man unless you have education and experience.

Let us admit this fact as fundamental. Many of our great industrial generals of today and the majority of our industrial lieutenants such as overseers, foreman and superintendents have acquired their education after years of practical mill experience. They scrub, sweep, doff, run frames and fix tools the first five or ten years of their working experience. Then comes their gradual search for education, aided by home study courses and spurred on by their determination, by that fire of ambition which burned within them. I take off my hat to everyone of them.

Now here comes the lad who hitches his horse to the other end of the wagon. He gets his education first. He is either fortunate in having good parents to support him or, being a real man, he supports himself in college by waiting on tables for his meals and fixing furnaces and cutting grass for his room rent. There are hundreds of boys

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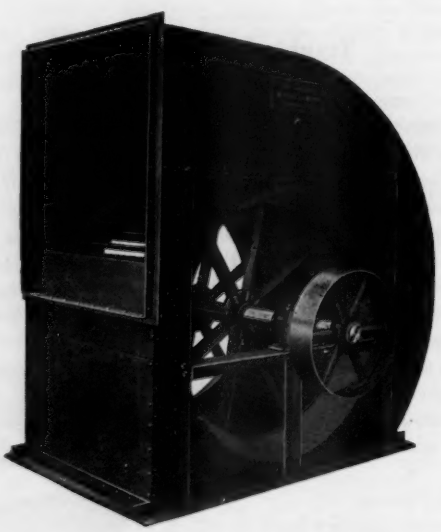

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This has been demonstrated too many times. The successful college men in our mills today are the ones who are helping the other fellow with textile calculations, running a small class at night in "foremanship" and in a score of other ways are giving *service* to the "broom handle men" who have "done everything from sweeping to fixing looms." You can't keep a man down who is happy to *serve* his fellowmen, and none is more anxious for his success than are these same fellowmen whom he serves.

I wish we could strike this word to the heart of every textile graduate. Bill (Ga.)

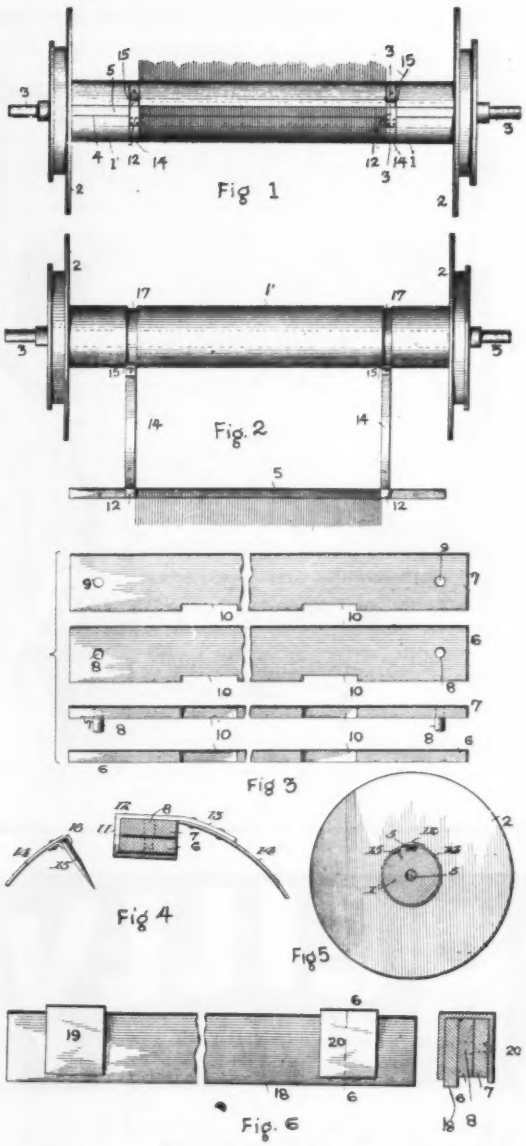
A Warp Beam for Reducing Waste.

EDITOR COTTON:

The reduction of waste at the slasher is a much-discussed problem at the various meetings of operating executives at this time. Thinking it of timely interest in this connection, I am submitting the accompanying diagrams, illustrating an effective warp beam attachment for reducing the amount of waste, which has been patented by James R. Bangle, superintendent of the Proximity Mfg. Company, Greensboro, N. C., and Shields R. Hunter. I saw the device in use in a North Carolina mill and secured permission to describe it in COTTON for the benefit of those readers interested in this subject.

The principle of the device is to have a couple of warp-clamps, which fit into a groove in the beam, and the warp ends are placed between these clamps, the tails cut off, the clamps placed in the groove and the beam started. The warp-clamps are fastened to the beam by means of two bands which encircle most of the beam's circumference and are secured to the beam by means of staples, so that when the beam runs out there will be no irregularity—but here's a detailed description, taken from the patent papers and based on the accompanying illustrations:

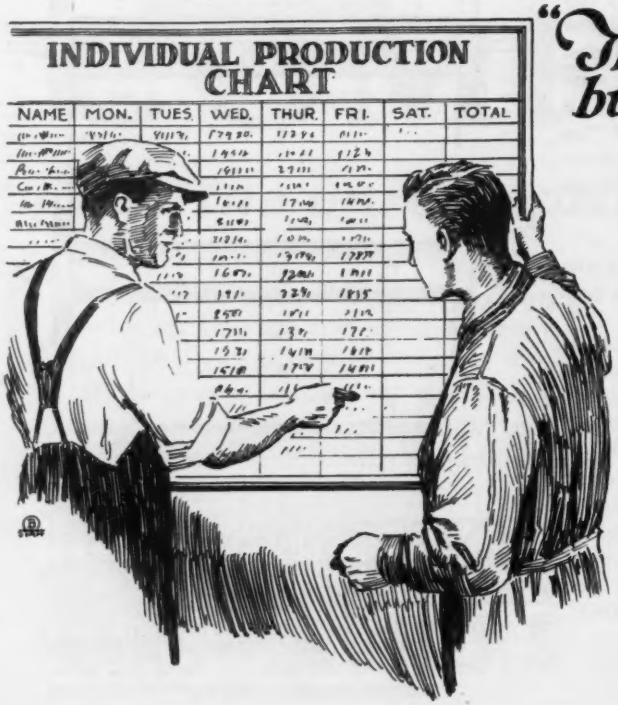
In the diagrams, Figure 1 shows a warp-beam embodying this invention, with the warp clamp in its normal position and with the warp encircling the beam. An end view is shown in Figure 5. In Figure 2 the warp clamp is shown in position when all the warp has been drawn from the beam. Figure 3 shows a detail of the warp clamp showing the bars in edge and in plain view on an enlarged scale. The band by which the warp clamps are held to the beam, and which encircles the beam, is shown in Figure 4, which also shows a transverse vertical section of the warp clamp, demonstrating how the hook on the band is fastened



around the warp clamp.

A gauge-plate fastened to a warp clamp by means of clamp-jaws is shown in detail in Figure 6. This gauge-plate is a little wider than the warp clamps, and serves as a guide for severing the warp as it proceeds or is being unwound from the slasher, warper or other preparatory machine.

When a beam has been filled with warp, one of the warp clamps is placed under or below the sheet of warp, and the other upon the sheet, with the holes shown in one registering with the pins in the other, and the warp clamps are then turned over, wrapping the warp around them, and the guide-plate is placed upon the warp clamp and secured by the jaws as illustrated. The sheet of warp is then severed with a knife along the outer edge of the guide-plate, the full beam removed and another beam placed in position to be filled. The guide-plate is removed and the clamp hooks applied to the warp clamp and the warp wound upon the empty beam. In unwinding the warp, the



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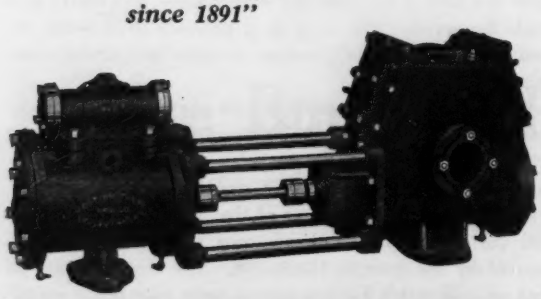

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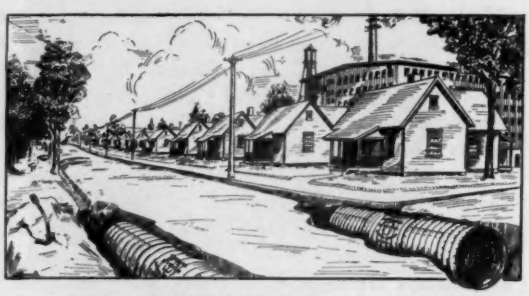

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bands unwind from the beam and the warp clamp extends very near to the whip-roll, where the beam is stopped and the warp severed, resulting in a minimum amount of waste.

In Figure 4 is also shown the end of the metallic band and the staple by which it is secured to the beam. The beam is provided with concentric or circumferential grooves, as shown in Figure 2, in which the bands lie when the warp is being wound upon the beam to prevent entanglement of the warp with the bands, and to provide for absolutely even and regular winding of the warp and prevent uneven lengths of the strands of warp, which, as the mill man knows, produce slack in the long strands as they pass through the harness on the loom, and consequent defects in the cloth being woven.

I am sure that any reader of COTTON interested may secure any further information desired by writing to you, and you can pass the request along to Mr. Bangle.

BOB (Ga.)

Calculating Production for Spinning Frames and Twisters.

EDITOR COTTON:

Calculating the production for spinning frames and twisters is many times found to be a lengthy problem, where the complete gearing of the machines are not at hand, as is often, I might say usually, the case. The various cotton machinery manufacturers publish tables of production in their catalogs, with recommendations for spindle speed, twist per inch, etc., for the various counts, but a comparison will show that they do not altogether agree on these points, and so where a spindle speed or twist per inch differs so also will the production be different. And then again, the mills will use spindle speeds and twists for special purposes which are entirely different from these recommendations.

The factors governing the production are the spindle speed and twist per inch. For any yarn there is a maximum spindle speed and a certain twist per inch to be inserted. The twist is governed by the number of revolutions of the spindle for every inch delivered by the front roll, and is usually a predetermined factor that governs the entire gearing in the head-end, with known diameter of front roll, diameter of cylinder and diameter of whirl.

These are all well known facts, repeated in this letter to form a connection for what I would like to bring out. The sketch herewith shows the principal parts governing the speeds in tape-driven frames. The usual formulas for calculating the production for spinning frames and twisters are as follows: When

P = Production per spindle in pounds per ten hours.
A = Diameter of front roll in inches.
B = R.p.m. of front roll.
C = Time in minutes of continuous running.
D = Allowance for stoppage for oiling and doffing.
E = Count of yarn spun or twisted.
F = Number of teeth in front roll gear.
G = Number of teeth in twist gear.
H = Number of teeth in stud or jack gear.
I = Number of teeth in cylinder gear.
J = Inches per yard, or 36 inches.
K = Yards per hank, or 840 yards.
R = Ratio of cylinder to whirl.
S = R.p.m. of spindles.
T = Twist per inch.

$$P = \frac{B \times A \times \pi \times C}{J \times K \times E} \quad (1) \text{ or}$$

$$P = \frac{B \times A \times 3.1416 \times 600}{30240 \times E} \quad (2) \text{ or}$$

$$P = \frac{B \times A \times .0623}{E} \quad (3)$$

$$B = \frac{S \times I \times G}{R \times H \times F} \quad (4) \text{ and}$$

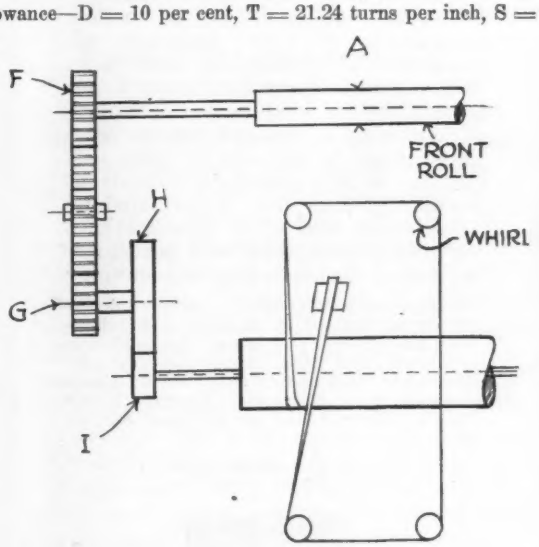
$$B = \frac{S}{T \times A \times \pi} \quad (5)$$

$$T = \frac{F \times H \times R}{G \times I \times A \times \pi} \quad (6) \text{ also}$$

$$\frac{F \times H \times R}{G \times I \times A \times \pi \times T} = 1 \quad (7) \text{ also}$$

$$T = \frac{S}{B \times A \times \pi} \quad (8)$$

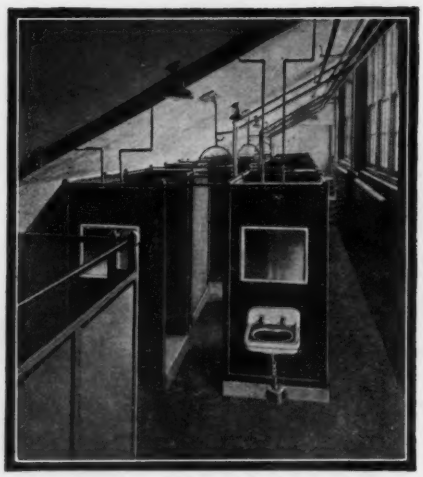
As an example, let us take 20s warp yarn with an allowance—D = 10 per cent, T = 21.24 turns per inch, S =



8,950 r.p.m., and A = 1 inch diameter. Next let us assume: R = 8.80 to 1, I = 26 teeth, H = 132 teeth, G = 67 teeth, and F = 100 teeth. Then to find B or the r.p.m. of the front roll, we have, according to formula (4),

$B = \frac{8950 \times 26 \times 67}{8.80 \times 132 \times 100} = 134$ r.p.m., from which we find P, according to formula (3), thus

$\frac{134 \times 1 \times .0623}{20} = .417$ pounds, and allowing 10 per cent for D then P = .417 × .9 or .375 pounds per spindle per ten hours.



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From formula (5), the front roll speed may be found without having or assuming the head-end gearing and cylinder to whirl ratio. Taking the previous example, we have

$$B = \frac{8950}{21.24 \times 1 \times 3.1416} = 134 \text{ r.p.m., and for P use}$$

formula (3) as before.

In both these examples, the speed of the front roll was used as the basis for calculating the production, but the same result may be obtained by using the spindle speed and twist per inch only as a basis.

By substituting formula (4) for B in formula (1), which will then read

$$P = \frac{S \times I \times G \times A \times \pi \times C}{R \times H \times F \times E} \quad (9)$$

and by comparing formula (9) with formula (7), and cancelling all equal terms, it can readily be seen that the formula for P will be reduced to

$$P = \frac{S \times C}{T \times J \times K \times E} \quad (10)$$

or when based on ten hours continuous running

$$P = \frac{S \times 600}{30240 \times T \times E} \text{ or}$$

$$P = \frac{S}{T \times 50.4 \times E} \quad (11)$$

Taking the same previous example, we have:

$$P = \frac{8950}{21.24 \times 50.4 \times 20} \text{ or .418 pounds, and allowing}$$

10 per cent for D, .418 × .9 = .376 pounds per spindle per ten hours.

This shows that the matter of ratio of cylinder to whirl, gearing in head end and diameter of front roll can be entirely eliminated when calculating production.

If it is desired to find production in hanks, production

$$\text{in hanks} = \frac{S}{T \times 50.4}$$

In case of ply yarn on twisters, find the resultant count and proceed as before, making proper allowance for contraction due to the twist inserted. H. H. (Mass.)

A Method for Cleaning Card Flats.

EDITOR COTTON:

Clogged and dirty flats is a common evil in many card rooms. There are several methods for cleaning the flats and keeping them clean, but the best method is as follows: (1) Remove the flat cleaning brush on the front of the card; (2) tack a strip of burnisher fillet between the bristles; (3) cut the bristles to correspond with the length of the fillet; (4) tack a strip of burnisher fillet on the burnisher roll in coils five inches apart; (5) have a band pulley made 3½ inches in diameter.

Then run the flat stripping brush in the usual way and set to the flat so that the ends of the burnisher wire on the strip will just touch the foundation of the flat. Run the roll with the coils of burnisher fillet reversed to that of the grinding roll.

I shall be glad if the readers will try this and let us know how it works. Wash (R. I.)

What Are the Best Settings for These Machines?

EDITOR COTTON:

Will you ask through the columns of COTTON what, in the opinion of your readers, is the *best* setting of rolls for the following machines, stock and speeds:

DRAWING FRAMES.

Front roll, 1⅜ inches diameter.
Second, middle and back, 1⅛ inches diameter.
Front roll speed, 348 r.p.m.

2.00 hank roving:
Front roll, 1⅛ inches diameter.
Second and back roll, 1⅛ inches diameter.
Front roll speed, 160 r.p.m.

1.40 hank roving:
Front roll, 1⅛ inches diameter.
Second and back roll, 1⅛ inches.
Front roll speed, 180 r.p.m.

⅞ to 1-inch staple cotton.

I am anxious to improve the evenness of our roving and any information you have on hand that you will give me or that you may be able to procure for me through the columns of your publication will be greatly appreciated.

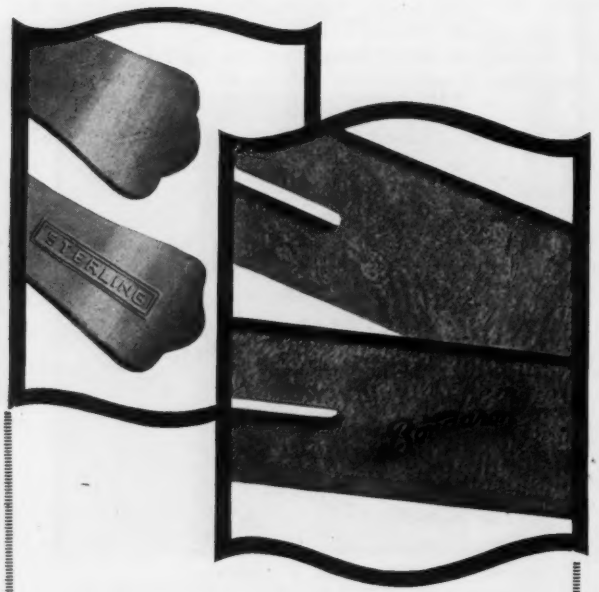
W. M. T. (N. C.)

Reducing the Cost of Power.

EDITOR COTTON:

The letter by "N. B. M." on this subject in the October number of COTTON not only is timely, but covers the more important ways in which power is wasted without being apparent to the casual observer. It naturally follows that these are the ways that should be carefully and persistently investigated. He mentions one source of waste of power that I believe merits special emphasis, viz., shafting and belts. No shaft, line or counter, will remain in proper running condition for any considerable length of time. No matter how accurately and thoroughly the work of adjustment or readjustment is done it can not be depended on to remain so for more than a few months. The constant jarring of joists and stringers; the alternate tightening and relaxing of belts; the constant effect of pulleys that are, even slightly, out of balance, and the expansion and contraction of the shaft, bearings and supports all tend to undo the work of adjusting the many separate parts—the bearings.

Ball bearings for medium and light work, and roller bearings for heavy work reduce the friction or dead load to a great extent. Such bearings permit a further saving to be made through the belts, because wherever the load is fairly steady the belts may be further slackened after putting in the friction-reducing bearings. Personal experience in reducing dead load in three fair-sized establishments leads me to direct especial attention to the shafting, pulleys and belts. Eliminating the unessential details, in one of the mills the belt "doctor" and his helper attended to such matters exclusively, including the oiling of minor counter-



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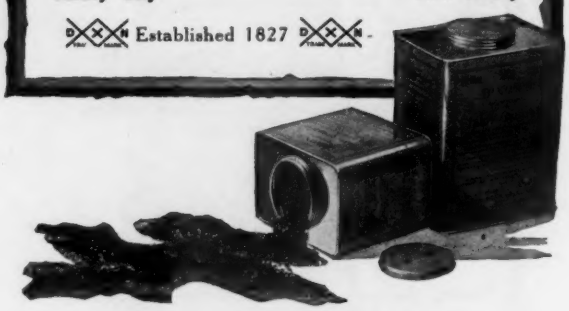

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shafts. The chief engineer took indicator diagrams from all engines over 50 horsepower, every month, for the purpose of detecting and locating sources of waste.

Everything had gone along smoothly for eight months or more when it became necessary to run overtime for a few weeks. Only a part of the establishment was behind, however, and only that part was run, but it necessitated the use of a large part of the shafting. It was noticed that the firemen worked about as hard with the productive capacity of the mill cut down to about 20 per cent as they did when running under the normal full load. Of course the first inquiry concerned the blowing of the boiler tubes, cleaning of fires, temperature of feed water, etc., all of which had been properly attended to. Sections of shafting were then stopped long enough to take an indicator diagram. This experimenting located the cause of the enormous unproductive load. If it had not been for running overtime there is no telling how many more months such a wasteful load would have been carried. Friction loads are not revealed by inspection.

Work of rehabilitating the shafting and belts began at once, working nights, daytime and Sundays so as not to interfere (seriously) with production. Repeated trials showed that the dead load was 68 per cent of the average full load! Needless to say that every bearing and every countershaft was gone over—first cleaned then lined and the belts properly adjusted for tension. In three weeks of such odd-time work the dead load was reduced to about 38 per cent, and finally to 31 per cent. The various shafts were gone over time and again until they could be turned by hand (with belts off), the weight of one man at the rim of the driving pulley being sufficient to turn a shaft 122 feet long.

Following this thorough going-over, fixtures were put up and devices provided for quickly checking up the alignment, level and the ease or difficulty with which a shaft could be turned. After that the cost of keeping down needless friction was very small compared to the value of the fuel saved. One surprising development was the frequency with which certain lines of shafting and certain countershafts had to be readjusted. One shaft only 66 feet long had to be realigned every three months, while others would be found in better condition at the end of six months. This experience convinced me that it is not a good plan to assume that all shafts will remain in proper working condition for the same length of time. It is customary to go over all shafting, say, once a year, and to assume that none of the lines or counters will need attention at shorter intervals. I believe such a course results in a great deal of needless dead load in most any establishment. Pulleys are supposed to be properly balanced. In a great many instances the facts do not corroborate the supposition. The higher the speed and especially with a jerky load, the greater is the need for proper balancing. Another cause of waste is the placing of countershafts too near the line shaft which necessitates too much tension on the belt from the latter shaft. The balancing of the load ordinarily is fairly well done. Another unnoticed source of waste is clutch pulleys and couplings. Very often a belt doctor will tighten them too much and when they are disengaged they act like a brake. Clutches are especially effective as brakes, without causing any trouble by heating, when on a high-speed shaft. Very slight resistance at the clutch then puts a considerable extra pull on the main drive.

The foregoing experience, together with two other similar instances, have made me somewhat of a crank on the subject of needless or unproductive load. An analysis of the load in a good many mills would reveal conditions that few men realize exist. Fortunately it is not necessary to invest in the most expensive appliances in order to get very gratifying results. Home-made devices properly handled may be made to serve every purpose. My experience has been that much more depends on the men knowing how and being willing to use such devices than on the cost and elaborateness of the design and construction of them. M. M. (Ga.)

Picker Draft and Even Laps.

EDITOR COTTON:

In reference to the query of "J. D. (Maine)" in the October issue of COTTON, concerning draft on cotton pickers and its effect on the making of even laps, I should like to give a few facts that might be of some interest in clearing up any evils that may exist with regard to uneven laps.

Common draft on a breaker picker runs from 2 to 2.5; that is, the calculated or machine draft, and this draft is seldom altered. A change in weight of the breaker lap usually is made by moving the spike roll away from or toward the feed apron as the case necessitates. The speed of the spike roll or the lifting apron also affects the weight. The evener on a breaker, if so equipped, is used for adjustment of weight in ounces.

On an intermediate picker the common draft runs about 4 or is generally in the neighborhood of the number of doublings being used. The same is true of a finisher picker, the range of drafts being from 3 to 5.

In my opinion the question of even laps from a picker is not a question of drafts, either as a whole or as regards intermediate drafts, but is rather a question of even feeding and an even running cotton. By this I mean that cotton that has been thoroughly blended and allowed to remain in a mixing bin, if conditions so permit, will usually produce an evener lap than cotton that is opened and passed directly through the preparatory stages without this ageing. Moreover, the evener motion on pickers is of vital importance and care should be taken to see that this attachment receives the proper oiling and adjustment as regards working if only three laps are run as well as when four laps are on the feed apron. Some men believe that the evener belt should be run on the center diameter of the cone, but I favor running with the belt slightly over the center toward the large diameter, as the belt slippage will not be so great.

The air draft through the ends of the cages will affect even laps if not properly adjusted, by causing one side of the lap to be thin and the other thick; but this is not a common occurrence.

Some claim that ball bearings on aprons result in more even laps and the only way to determine this is to have these put on a picker and compare the results with the work of machines not so equipped.

I realize that I have wandered somewhat from the orig-

inal question as to the effect of draft on evenness of laps, but in my own opinion, it is not a question of draft, but rather of the factors mentioned. We know that drafts on pickers do not vary extensively.

I would suggest that "J. D." watch the points mentioned over a period of time, see that the pickers are scoured often, and test his laps for total weight, and furthermore, try the two-yard interval test which really determines whether he is getting better results as to even laps. And I should like to hear of any results that he might obtain.

Bert (R. I.)

Replies to Slasher Questions.

EDITOR COTTON:

I wish to help out if I can in the discussion on slashing. First, in reply to "R. G. S.'s" inquiry in October COTTON as to what will stop frosty or white spots on colored warps when being slashed. Thoroughly cooked size with the proper kind of softener, a clean box, good covers on the rollers, the size kept at a boil, and no size roll marks—all these things will aid. Lumpy starch or sizes not thoroughly amalgamated with the other ingredients will positively give trouble on any kind of warps, but will show up more on colored work.

As to "Contributor No. 14's" request in which he asks a lot of questions on slashing, opinions on some of these can be found by reading the report of the slashing-weaving discussion meeting of the Textile Operating Executives of Georgia in the October number of COTTON.

One question he asks is "Do you file off the sharp (or rough) edges on loom beam heads?" I certainly do, but never at the slasher. It is just a trifle late to begin to fix empty loom beams when one requires them. First rate management has these things all attended to as the beams come back empty from the weave room. In a small plant a helper can do this work; in some large mills a handyman is kept who has a bench with a sort of a lathe on it on which the empty beams are placed, tried out for trueness of journals, loose bolts in the heads, rough places on the flanges and other defects. Section beams should be looked after in like manner.

"Contributor No. 14's" next question is "Do you have a regular system of how many ends to count off in the striking comb (not the lease comb)?" I maintain there is no such thing as a lease in yarn any place on ordinary slashing, except where one uses the pin lease on the front of the raddle on fancy pattern work, where from two to four colors may be run in the same dent; and the men are few and far between who know and can run a colored slasher this way.

Getting back to white or plain slashing, the split rods are placed between each section or division, which is no lease. Now as I understand it, "Contributor No. 14" gives one the idea that because two threads from any section run in the same dent after leaving the splitting rods at the front of the slasher, it makes dressed doubles and causes all sorts of trouble at the tying-in machine. Bunk! The writer worked at a mill in South Carolina, running 50s, 2,800 ends, six beams in a set, and used a striking comb with 400 teeth, seven ends to the dent, and the weavers operated twelve old style looms with the warp stop motion, the Draper weavers running 24 looms—and the tying-in man had no trouble. I'll leave that tale about that "Seer" of a tying-in man who knows more about slashing than the tender who is watching the process of the yarn at each revolution from beginning to end of the loom beam for somebody else to believe. But I do not mean that all slasher men are first-class, and I also know that a poorly laid sheet of yarn is detrimental in tying-in. If anyone knows where there is a man with the ability, who can take a set of section beams—say, 2,000 ends, five beams of 400 ends each—and put the beams in regular slasher style, three beams bottom and two on top of the creel, lace up and use a 400-tooth striker, and after striking comb through yarn, look over the sheet to make sure there are five threads in each dent, and still claim that when he runs tapes through and lays in at the front he has one end in each dent from each section with no two ends from any sheet—"if such there be, go mark him well!"

This feat isn't done by random striking but it can be done and is being done by counting in at the front. I am afraid there are some overseers, and superintendents, too, who have never seen a slasher in operation as a tape dresser—for if they once did, they could also be convinced at a glance that two ends from one section on a slasher is not the cause of dressed doubles, from the very fact that when running taping style, 200 ends would be in the lease reed, two threads in the dent, at the back of the size box, with one split rod at front, the yarn running through the raddle six ends in the dent; that is, 1,000 threads to one sheet of yarn or three ends going from each sheet into one dent. There are no better warps made.

In an issue of COTTON some months back, we had a little story which told us that the boss weaver was the only one in the mill who knew how to slash warps. Now comes along another man who claims that honor for the tying-in man. Who'll be the next?

There is nothing I like better than these discussions. Someone will derive benefit from some of the remarks. There isn't a one of us who has any idea of the range of styles and different stunts that a slashing machine can be made to perform, when manipulated in the proper manner. When one looks back 30 or 40 years ago, when running four to eight looms was a great feat for a weaver, we may get the idea that all the credit for better weaving conditions belongs to improved looms, etc., but not so. The warp preparation, in all its branches, has been improved so much in that time that some of the credit belongs there. It used to be "How much can one get off a slasher?"—now it is, or should be, "How good can one make it?" My hobby has always been quality first; quantity will come of its own accord.

Mack (Ga.)

Pertinent Points for Mill Men.

EDITOR COTTON:

I've been thinking for some time that I would write COTTON regarding what I think of "Old-Timer," who seems to have the right-of-way on the page preceding the beginning of the "How Other Men Manage" department each month. He is worthy of taking the lead, for it seems that he is right in the fight or is so well connected with the fight that we all have to contend with that he strikes the

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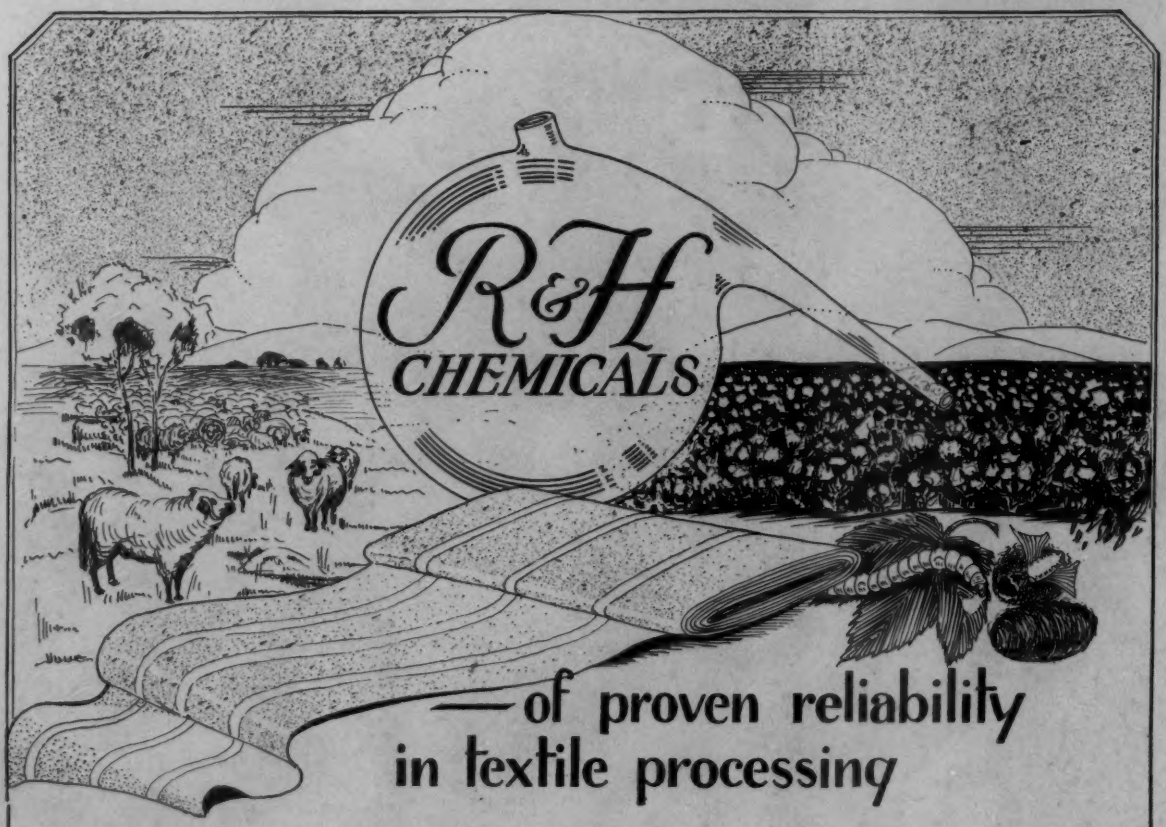

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keynote in most every line he puts out.

For instance, in the June number, he says: "Tall trees from little acorns grow. Yes, very true, but most of the young men of today don't want to take the trouble to plant the acorn." And they don't want to wait for the coming of the season for the little acorn to grow into their expected realm of harvest. They want to get to the top too quickly, which shows that they are growing too fast in theory, and can't wait for the practical side of the game which is just as essential to success as the theoretical side. The two make a balancing power for operating a plant successfully.

In the next paragraph, "Old-Timer" says, "If overseers could realize that ten inches of first drawing sliver makes over ten miles of yarn, they would be more careful to teach drawing hands to put up ends properly."

This hardly ever occurs to the average overseer, until he is reminded of the fact. He knows it, but doesn't remember it, sometimes. After seeing "Old-Timer's" comment, I asked my overseer what he thought of it. He said he had noticed it and had figured it out to be about what "Old-Timer" had said, but that he had never given it the consideration he should, but after reading this and figuring it out, he was going to make better piecing on his drawing frames than he ever did before. Which goes to show that we too often are familiar with a thing that isn't for the best, but we are waiting to be reminded of it, persuading ourselves into believing that we are correcting things of a more important character than the average operative can see.

And keeping the frame going, regardless of its condition and the kind of production that is being put through it, is mostly the "tack" that most section men follow, and the overseer, noting that it is going good, pacifies himself with the assumption that it is all right, not noticing the small things which are the most important and which can cause the meanest kind of trouble. Such things are likely to pop up and he can't realize what is causing it, as it is so small, yet so simple.

Regarding promotion, which some young men think they are in line for, brings to mind an incident that occurred in a lumber camp. As the story goes, a younger man was promoted over an elderly man who thought he should have had it, and the elderly man asked the foreman why he had promoted the other man ahead of him. The foreman told him to come in and sit down for a few moments, which he did. Then the foreman asked him if any logs came in that day. He said, "I'll go and see," and came back and reported that some had been received. "What kind of logs are they?" asked the foreman. "I'll go and see," was the reply, and the man came back and reported they were poplar. "What condition are they in?" was the foreman's next question. "I'll go and see," said the man, and reported back that they were in good condition. "How many?" asked the foreman. "I'll go and see, was the reply, and the man then reported there were 300.

"All right," said the foreman. "Now we will call in the young man whom we promoted, and ask him about the logs." The young man was called and the foreman asked, "Did we receive any logs today?" "Yes, sir," the young man replied promptly. "We received a lot of 300 poplar logs in good condition, and I got them ready for embarking and counting to check the invoice bills that you received." Then the foreman turned to the elderly man and said, "That's the reason we selected this man. He had all the data at the first asking which it took you more than an hour to get up. 'Doing' is the best promise of promotion."

Regarding mistakes, the man who doesn't make any never gets anywhere in life, and the man who makes too many generally gets fired.

"Old-Timer" brings out a lot of good points that otherwise would never come out, and the way he does it is virile and easily understood, and if a subscriber does not read anything else, it is worth while to keep posted on "Old-Timer's" reminders, for they are just like questions that are likely to be asked of you by your superior, and, of course, you want to always make as good an impression on your boss as possible. So keep posted on what is going on in COTTON, as well as what "Old-Times" has to say to you, for your boss is reading "Old-Timer" and the managerial series of articles in COTTON every month.

Some of the questions are likely to be along this line: What do you think of "waxing" the bands on the spinning frame? My answer, speaking from experience, is that the yarn is made five per cent stronger thereby.

Then: What do you think of putting seven strands of card slivers up at the first drawing, and seven strands on the second drawing? My answer is: eight per cent stronger yarn. Of course it is necessary to draft the slivers down to the required weight if already on the standard drafts, but by actual tests the result given was secured. In a mill where they were up against it for breaking strength in the cloth, when this was done they overcame the trouble; also everything else they could think of had already been done.

Then a further saving was effected by installing lift-trucks in the opening room, which eliminated the work of one operative, the lift made it so much easier for the operative to handle the bales of cotton. This was done by making tables to lay the bales of cotton down on, and using the lift-truck to carry these bales to the front of the hoppers and thence through a suction pipe to the lapper room. By opening them up in this way it is possible to open three days' run ahead and allow the cotton to air out. It takes up so small a space, being on the flat tables just the size of the bale of cotton; and then, too, it is so much safer in case of fire. This cotton is classed out in ten-bale lots for the mixings, as ten bales are mixed in at one time, and is then fed evenly from each bale, until they are used up, through the suction.

Putting balance wheels on the top cones of the warpers has been found to be a great help in making the warpers run smoothly. These balance wheels will have to be determined in weight by the speed of the individual warpers. They keep the traverse cone belt operating on the warper; too many people say they keep the cone belt in order and it operates, when they *do not*. It is quite essential that the cone belt operates exactly as it is made to go, regarding the proper weights for the top cones. On 30s yarn, twelve pounds has been found to be a good medium weight. Take a wheel with a good rim, turn it down true and balance it.

Ball bearings on the measuring rolls on the warpers have been found to reduce the amount of thread waste behind the slashers on the warper beams to a minimum of an average of ¾ of a pound a beam, whereas, with the old type of bearings on the measuring roll, the amount ran to an average of two pounds per beam. Think of the difference in waste. Of course some beams would not have much,

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while others would have several pounds, practically or nearly so, which makes quite a difference in the measuring of the wraps on the warper beams.

A good method is to keep a record of each warper beam, of its laps, amount of soft waste, and the amount of hard or sized waste from each individual slasher tender's work, so that these items can be checked up daily, and an accurate account be given of everything that does not go into first-class work. I began this system some time back, and it is surprising the difference it makes in the amount of reduction in soft and hard or sized thread waste. It pays to have these reminders. Contributor No. 14.

A Finish for Warp Sateen.

EDITOR COTTON:

I am sending herewith a sample of white warp sateen which is for re-dyeing, to be dyed black, and I would greatly appreciate it if some of your readers could give me a formula for producing the same finish on the dyed goods as is on the white sample. C. K. (Wis.)

EDITOR COTTON:

Regarding "C. K.'s" sample of bleached sateen to be dyed black and finished like the original bleached sample, I would suggest that he proceed as follows:

After dyeing, wash and mangle thoroughly, dry up, cool off, damp well and let lie two hours, calender warm twice on face, starch with 80 pounds yellow dextrin, two gallons oleine oil (50 per cent) water to make 100 gallons, dry, cool off, damp, let lie for two hours; break down if necessary and stretch, this gives a dead glossy finish, and a fairly full feel. W. B. (Maine)

A Cotton Mixing and Bedding Machine.

In view of the extensive discussions going on with regard to the merits of various systems of opening and mixing cotton, a study of an automatic mixing and bedding machine invented by G. C. Truslow, Draper, N. C., and described and illustrated herewith, should be of interest to practical men in the mill.

Reference to the illustration will show that a short vertical shaft is journaled in a bracket which is carried in suitable bearings on the upper end of an upright post or standard. This shaft supports a revolving platform, and motion is secured from a driving shaft journaled in one side of the mixing compartment carrying a beveled gear which meshes with a similar gear on the shaft, the shaft being propelled by power transmitted to the pulley outside by belt or other means.

The feed pipe through which the fiber being worked enters the machine is noted at the top left; this has an elbow and short downward-turned vertical portion which is in vertical alignment with the shaft which supports the revolving platform. A distributing arm is supported on the revolving platform, and one end of this "L" arm carries a flange which receives the lower end of the feed pipe. The balancing weight at one end of the platform serves to offset the weight of the "L" and prevent friction between the collar on it and the feed pipe.

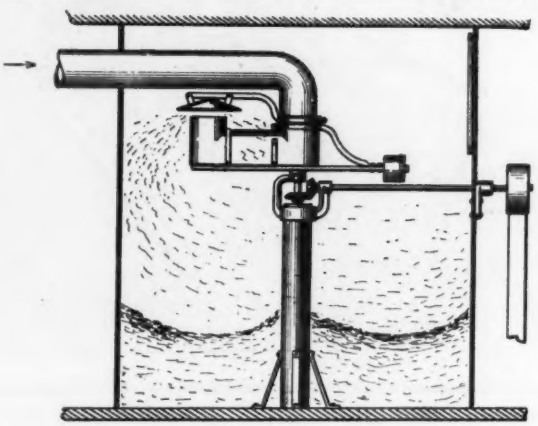
At the outer extremity of the "L" is noted a conical de-

flector directly above the open end of the "L" and supported by a bracket. The underside of this deflector is constructed with radially curved webs so that the air passing through the "L" will engage these webs and cause the deflector to rotate.

The fiber enters the machine through the feed pipe, passes through the "L" and is driven out against the deflector and scattered about the floor of the compartment, the distributing arm and deflector revolving all the while by the means indicated, which, the inventor states, produces a steady and thorough mixing and blending.

A modification (not illustrated here) provides for the positive rotation of the conical deflector by means of beveled gears working from a crown gear placed on the vertical portion of the feed pipe.

Mr. Truslow states that the only labor used for this work is the operator who feeds the preparatory machine. This machine may be attached to bale breakers, Crighton



openers, willows, mixing pickers and other preparatory machines. The machine is located in the center of the mixing or bedding room, and mounted on top of a frame work close to the ceiling or roof, and as the machine revolves continuously over the bedding space, the stock is scattered and bedded over the entire bedding space evenly and systematically.

The subsequent cleaning processes will be benefited by the use of the machine, said Mr. Truslow, as the fibers will be more thoroughly opened and the foreign matter will consequently drop out more easily. One main feature claimed for its use is that it produces even shades and secures the same average staple throughout the mix. In running bleached raw stock, it is further pointed out, a small amount of steam or humidity can be used in the mixing room and as the bleached stock falls to the bed the dampness will be carried down with it, retaining a portion of the dampness to help eliminate electricity in carding and other processes.

Following the textile exposition in Boston, forty members of the Parks-Cramer organization held a three-days' sales and engineering conference at their headquarters in Fitchburg, Mass. November 5th to 7th, which was very helpful. Seven members of the Charlotte organization and two from the Atlanta office were present from the South. A discussion of various phases of humidification and piping was conducted, and possible improvements of service to the customer, and in regard to other features of efficiency relating to air conditioning and piping matters in the textile industry.

The College Man in the Mill.

EDITOR COTTON:

I have noticed with a great deal of interest the letters appearing in COTTON on the subject of the college man in the textile manufacturing industry, which began with "H. E. R.'s" call for a fair deal on the part of his fellow elbow-workers. These discussions have been of especial and direct interest to me because I am a college man, a graduate in textiles from the South's largest technical school, and am just beginning to see the flicker of the light of success —after spending two years in working in, around and through the mill, and I have been over the road around which this discussion is firing.

There is no argument against the fact that the cotton mill business needs the college-trained man at this time, more so than any other line of business; and especially is this true in the South. And the mills are becoming aware of this necessity, as is evident from the call they are making for textile school graduates and trained men.

The field of opportunity is actually being pushed upon the young man of today, but in the mill, as in every line of industry, the man must make a place for himself and fit into the work that he selects. The young man is the part that requires the shaping to fit the industry, for the cotton mill business is one of too great a magnitude to be changed to fit the man. The textile graduate is being handed a great field and it is up to him as to what he does with this opportunity.

After the first day's work on the inside of the mill—and this is speaking from personal experience—the college man feels that he has been in a different country from his native one, and that is perfectly natural. Imagine what the feelings of one of your doffers would be if he were taken from the spinning room on a moment's notice and placed in a college school room. It is obvious that he would be and feel as much out of place as the average man right out of college does the first day in a cotton mill, more so, perhaps.

An attitude of superiority over other classes of his fellow man might bring success to a man in the bond and automobile selling game, but a nose-in-the-air fellow will starve to death in a cotton mill, and the sooner he is out of the game, the better it is for him and also for his employers. Cotton mill operatives are not easily fooled, and they surely know a joke when they see him. There is no difference in human nature in a cotton mill and in any other walk of life. It is all the same, although it may be seen in a different light. Whether we work in a mill or not none of us will be driven, but we are easily led to do the right thing in the right way.

So if the college man refuses to accept human nature as it stands, he is beaten at the start. He must also exercise discretion and judgment in his approach when it comes to making friends, for he cannot learn the things he should, nor make any progress at all, without first making friends among his fellow workers. And just as in anything else, it is natural for a young man to be dissatisfied, grouchy, and eternally finding fault if he has not attempted to make friends, or "buddy" with those with whom he comes in contact.

In this respect, the average college man is to be congratulated. The majority of these young men entering the

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mills realize the value of making friends with the operatives, and also usually come from a class of society that is naturally more sociable, and that has developed the idea of fraternity and fellowship, and they desire to make friends. It is, therefore, up to the college man to take the initiative and make the first approach toward getting acquainted in his new surroundings. And not always, but in as many as seven out of ten times, he will find a ready response and a warm and hearty welcome. It will surprise him to find he can make as many, *and just as good,* friends, and just as easily, as he did during his days at school. Of course, in some instances the college man will receive the cold shoulder in his efforts toward companionship. But usually this happens only when he runs across one of the old, narrow-minded school who can only see from one angle and that is that "that young fellow is trying to learn my job, so he can beat me out of it." If that were true the young man would not expect a warm welcome in the first place, and it is up to him to show the old-timer that his real purpose is a higher one than trying to put him out of a job. We will have to admit that there are still quite a few of this narrow-minded, ear-touching class who make it hard for the young man entering the mill, but we are glad to know that this number is growing smaller every year. They are recognizing that a friendship with the college man is of mutual interest and advantage.

My first job after leaving college was in a finishing room running a great variety of colored fabrics, calling for a large number of different finishes to be put on the cloth. I was eager to learn as much as possible, but the first shot out of the box I ran into one of the type just mentioned. He was an incurable drunkard, and was running his job without thinking, holding onto it from his past experience, and by bluff, as he had been on the same job for more than twenty years. He not only refused to tell me anything important about mixing and cooking the different sizes, but ordered that all his employees should tell me nothing about the finishing room if I asked any questions. He would cut me cold with sarcasm, calling me "the new super," etc. He never gave me any assistance, but I cannot accuse him of giving me a raw deal, for he was later discharged, and "the new super" filled the vacancy.

Another fact about the college man is that he readily realizes that the average mill operative is in his present position and draws his present wage because he didn't have an opportunity or the education to improve his value to his company, and he is therefore willing and anxious to help him, and teach him all that he can. The young man, in fact, is more eager to assist the old men than the old men are to show what they know to the college graduate, but that doesn't prove that the college man isn't getting a fair deal. The industry will give him just as much as he will take or claim for himself, and he should not expect any more.

And when it seems that the young college man isn't getting a fair deal, the trouble is with the individual and not with the industry. The future of the business in the South is going to see a marvelous development. A great many young men are now being directed into the business by their parents and people having influence with them. These fellows should see that the cotton mill business is truly a good one, but also that it is one where the road is rough, especially at the beginning. It is a business that demands more than the average vocation, it is harder work, and calls for longer hours, often night work, but this is no reason for the college man to cry for a fair deal. He's already getting it. The road is a good one, and like everything else worthwhile, it calls for hard work and sacrifices. If the college man would stop to realize that all his life has been spent in preparing him for work, and that the drilling is much an easier life than the real fight, which he is just beginning, we would never hear cries for a fair deal. If he would forget that he has just achieved greatness, and is now a college graduate, and remember that he is only a freshman in the school of experience, it would be much better for him, and the shock of real hard work would not be such a great one.

The college man is in textile manufacturing to stay, and those who do make good are assured of great success, and they more than compensate their employers for the loss of those who turn back or wander to another road. The cotton mills are all competitors in the fight to reduce the cost of manufacturing, and the competition is so keen the winners must use the most efficient methods and processes. This is where the college man comes in to a good advantage, for regardless of his shortcomings, he has been trained for at least fifteen years to do everything in the shortest and most efficient manner.

An old head in the cotton mill game who has employed a great number of textile-school trained men and has given them every opportunity and a fair chance, recently said that only one out of five of them ever turned out to make him a good man, but that he still keeps on employing them, for he believes that that one man repays him for the expense and trouble of the other four in the long run. It is a noticeable fact that it is the large, successful mills, with foresight, who take the textile graduates every summer, and there is little argument to the fact that they are giving them a great opportunity, and above all, in every case within my observation, a fair deal. On the Road (Ga.)

Moisture Variation in Yarns.

EDITOR COTTON:

It is an accepted fact that a part of the variation in yarns is not a variation of the amount of actual cotton but a change in the quantity of moisture in the yarns. In mills located in favorable districts the atmospheric changes are not noticeable enough to be of much importance, but in other localities sudden weather changes result in corresponding increases or decreases in the yarn or roving. At such mills it would be of great value if, in taking sizes, any actual cotton variation could be separated from the change resulting from the weather, and necessary draft changes made accordingly. In my opinion this could be accomplished by the adoption of an improved system of taking sizes.

At present the usual system is to take sizes of yarn and roving at regular intervals. If any appreciable variation, light or heavy, is shown, a change of draft gear may be necessary. The variation might be caused by by the cotton, possibly due to a new mixing, or it might be the fault of the weather. The carder or spinner must guess, more or less, at the real reason and guesses are a poor thing to go on. In case the increased humidity in

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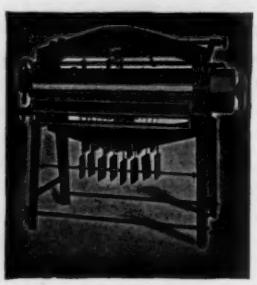

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LARGEST LINE BUILT IN U.S.A.

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the air made the size heavy, he might lighten up and bring the size back on the number. However, if he does so he is spinning a larger percentage of water and a smaller percentage of cotton. Therefore, after the yarn has been knitted or woven, and the garment or material made, the finished product, deprived of excess moisture content, will be underweight. The opposite also holds true and overweight garments may result. This variation may slip by the buyers and it may not, but honest, sensible manufacturing demands a 20s yarn when a 20s is called for.

Now my idea is this: When every size is taken, the wrapped roving or yarn should be placed in an oven, electric or other, designed to take out all the moisture. If the yarn strength is to be taken it can be broken before heating. After the cotton is thoroughly dried it is quickly weighed as usual. Then, as cotton naturally contains eight per cent of moisture, this percentage is added on. The actual size of the yarn or roving is the total weight.

The size thus obtained is the actual size of the yarn being spun, and changes in draft gears may be correctly based on it while the excess moisture is not considered. Often, when ideal weather conditions prevail, the size obtained by each system would be practically the same, but when the moisture content of the air changes, the drying system alone will remain correct. With the latter method, variation may be reduced to that unavoidably caused by the different nature of cottons.

I firmly believe in this plan for mills in districts where weather conditions are changeable, though I realize that at some times the difference would not be of great importance. Before becoming thoroughly accustomed to it there might be some trouble and difficulty in handling different estimated and actual productions. Weights, tensions and travelers might also be slightly affected. However, in spite of these possible difficulties the resulting more even yarn would justify the trouble involved.

Of course I know that many moisture tests have been made, but I have never heard of anyone making a regular practice of it and using it much in regular work. If any of the old-timers have had any experience along this line, or have any opinions, I hope to see them in COTTON.

Y. H. M. (Mich.)

Learning the Practical Side of Textiles.

EDITOR COTTON:

In the July issue of COTTON I read with interest the article by "H. E. R. (Mass.)" asking for a square deal, and as my experience has been just the reverse of his, I thought it might prove interesting to your readers and, incidentally, encouraging to our sore-stricken friend from Massachusetts.

First of all, I was born in England, and at the termination of the war went to college for a two-year course in textiles, which comprised the following subjects: Economics, engineering, spinning, chemistry, botany, secretarial practice, bookkeeping, yarn preparation, cloth analysis, textile design, cloth costing, weaving mechanism, and cloth structure.

At the end of the course I passed first-class and, armed with my certificate, expected to take the cotton world by storm. In the folly of youth I imagined that employers would be eager to obtain my services at my own price. After a few interviews with mill superintendents my complacency and assurance began to give way to doubts, and I wondered if I really knew so much about the cotton business after all. However, I put the fact down as due to a depression in trade.

About that time a strong invitation came for me to visit relatives in the United States, and availing myself of the opportunity, I located in Ohio for eight months, but that was far from the cotton manufacturing section, and farming didn't appeal to me in the least. (My relatives there are farm folks and they wanted me to stay with them and take up that life.)

I have other relatives in North Carolina, and as they were well acquainted with mill people and were willing to use their influence in my behalf, I decided to come South November, 1922. My spirits were high and I felt sure of getting a "white shirt" job, plenty of money, and not much work, but since then I have learned that cotton mills are not philanthropic institutions. My first interviews were not at all satisfactory—from my point of view. After being introduced to the different superintendents I immediately produced evidence of my textile knowledge and sat back with a satisfied smile, as much as to say, "There, look at that and see what a clever chap I am," at the same time trying to mentally decide on what figure I would ask when it came to salary. But somehow they didn't seem so eager as I had expected, and once again my complacency began to falter. They would say, "Well, that's a fine thing, but what can you do in the mill?" Of course I had to admit "Not a thing" as I had only been inside of one or two mills for a cursory glance around. It began to dawn upon me that theoretical knowledge was not all; in fact, that practical knowledge was equally essential. Yet I dared not face the thought of having to actually work inside the mill. Please do not mistake this for snobbery, but such a thing had never entered by head before. Still I chose not to see the writing on the wall and hoped to be able to get a position with theory as my only asset.

At that time I went to see the superintendent of the mill where I am now employed, and never will I forget his words. He said, "You've asked for my advice and I'm going to be candid with you. The probability is you won't like it, and I shouldn't blame you in the least if you did not take it." His advice to me was to start at the bottom and work up. However, we left the subject and I decided to see him the following week, but left the mill feeling I should not return. After studying and working so hard I felt it was too much to have the fruit still held out of my reach. During the intervening days I thought things over, though, and realized the truth of his words, so I reluctantly laid aside the "white shirt prospects" and decided to dig in.

I commenced the following Tuesday (the mill being closed on Monday on account of power) and had I known what lay before me I might have given up even at the eleventh hour. The first difficulty I had to contend with was the language, always having been under the impression that Americans and Englishmen spoke the same tongue. But I soon found out that I must learn to speak "United States."

My first experience was in the opener room, where I had to feed a hopper which delivered to the opener. That was the second week in last December. The opening room is apart from the main mill building, and that day it

snowed and was very cold. The door was open most all the time, so that I had a decidedly cool reception to the cotton trade.

The men I found very agreeable and willing to show me all they knew about the machines. When opportunity presented itself I counted teeth on gears and figured speeds, etc. On the second day, Wednesday, the man who ran the hopper laid out, so that I ran the machine alone, and there was not a prouder or more tired man in the whole of the United States that night. We were working until 9:30 p. m. to make up for time lost on the Monday. It required a big effort to rise at 5:15 a. m., my usual hour in England being 7:30 or later.

Since that time I have worked on nearly every machine in the mill, and already am more than satisfied with my progress. On every job I've had all the assistance needed and my fellow workmates are *never* tired of answering my questions, which are many. Often they laugh at my expressions and pronunciations, but theirs are equally humorous to me, so that the laughs come square. Of course, I've had disagreeable jobs to do, and expect more before I'm through, but the end will justify the means.

The only conclusion I can arrive at is that "H. E. R." happened to chance on a poor mill for his practical part and I happened on a particularly good one. I know that I have been laughed at, but who could resist laughing at my first attempts to put up an end on a card? Also, at the other machines where my fingers have felt all thumbs. Sometimes I have gone about things in a very clumsy way and have blushed to look up and find many amused faces bent upon me. The worst incident of this kind was when I tried to put up an end in the spinning room, and each vain attempt would bring forth pronounced giggles from an interested group of spectators, chiefly female hands.

Learning is never lost, and often I find use for subjects which I thought superfluous in earlier days. Then I think the attitude one adopts when commencing in the mill greatly determines the treatment one may expect from the employees. If they see you are anxious to learn they will help you, though they may smile at your clumsiness.

I agree with "H. E. R." when he says it seems unfair that a man who has spent so much time on education should have to sacrifice further time and money, but my point is that if I did not think the future would warrant the present sacrifice, then I'd quit right now. He cannot expect a mill to pay him big money while he is learning and of no practical benefit; they pay that money when he is through. The trouble is that "H. E. R." wants returns on his investments—i. e., education, etc.—when he leaves college, at the expense of his boss, and, of course, that is out of all reason, for no boss would do that. He has to make dividends or make room, and self preservation is the first law of nature, so that however necessary it is in the interest of the trade to train men for the big jobs, yet he cannot carry such a dead weight on his payroll. Someone will have to pay for my present experience in the future, but I do not expect my present boss to do it. It is just a speculation; you sacrifice time and money now in the hope of making good in the future. But I feel I can make good; hence it becomes less of a speculation.

"H. E. R.'s" chief complaint seems to be directed against the "Old-Timers." That seems so strange to me for I have had nothing but kindness and help in every direction. I lived among them and tried to understand them, and never will I forget the way my landlady treated me, for she seemed to realize what I was up against, and that I was, in very truth, in a new world. In return I have tried to help any who were sufficiently interested, in the calculations and theoretical side. In fact, I am hoping to run evening classes this winter for that purpose.

So, in conclusion, is it too much to venture to say that the reception accorded among mill people is the attitude one adopts with them. I do not criticize "H. E. R.," for apparently he has not been so fortunate as I, but with grit and determination he will win through. I have had numerous experiences that are humorous, too lengthy to relate here, but I shall ever be grateful for the help and assistance accorded me by all. N. F. (N. C.)

A Device Seen at the Boston Show.

A new type of device for cleaning and sizing yarn has recently been developed and placed on the market by the Grand Rapids Textile Machinery Company, Grand Rapids, Mich. The appliance was demonstrated and shown for the first time at the Boston Textile Show on a Universal winder, and H. A. Shields, president of the Grand Rapids company, was in charge.

The purpose of the device is to reduce unevenness in the yarn, at the same time cleaning the yarn, and it operates in the following manner:

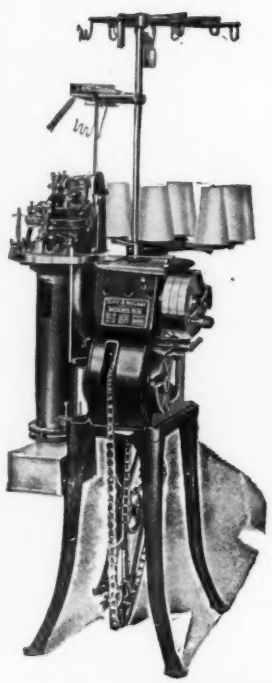
The device is applied to the winder between the bobbin or cone from which the yarn is winding and the cone or tube onto which it is being wound. The yarn passes through a regulating tension arrangement, from which it passes between two series of small bevel-edge discs, set at an angle to each other, and with the edges revolving against a hard metal surface. The yarn comes up over this surface between the edges of the revolving discs, the discs being accurately set according to the number of yarn being run. This adjustment is made by means of a screw and can be made to a thousandth part of an inch. There is no undue tension on the yarn in passing through the device, it is pointed out, and an especial feature claimed for it is that it is particularly useful for fine yarns for knitting in that it removes superfluous slubs and bunches from the yarn, and at the same time cleans the yarn, doing this without cutting or scraping it—thus producing a yarn more suitable for the exacting use of the knitting needle.

The recent completion of the Southern Spindle & Flyer Co., Inc., Charlotte, N. C., of a building 50 x 120 feet, with over 14,000 square feet of floor space, presents itself as an indirect indication of the development of the southern textile industry and those industries allied with it. This concern started in a room 30 x 50 feet, in 1900, and has grown to the size indicated by the size of the their new plant. This company was the first southern concern to regularly repair steel rolls, spindles, and flyers, picker lap pine, etc., and also was the first concern in this section manufacturing spindles, steel rolls, top rolls and flyer pressers and lifting rods, and is the only concern in the South doing this work today, it is stated.

KNITTING SECTION

NEW MODEL H-H

Producing Ribbed Top Half Hose Complete



Ribbed top made on two sets of needles.

Automatic transfer from ribbed stitch to plain.

Eliminating necessity of skilled help.

Saving of raveling waste which occurs when topped by hand.

Each stocking is dropped from the machine when finished.

Each stocking is automatically started upon the empty needles, producing a French welt without drawing thread or cutting, no ends of any kind to be removed.

Machine is fitted with five yarn fingers.

Provision is made for high spliced heel and double sole.

Provision is made for ring top and ring toe.

Needles without rivets on latches.

Speed of machine about the same as Model K.

Production about twelve stockings per hour on 3¾" 220 needles.

One operator can take care of the same number of machines as Model K.

The machine is built in all gauges.

ESTABLISHED 1865

SCOTT & WILLIAMS

INCORPORATED

366 Broadway **New York**

Hamilton, Ont.
Main and McNab Streets

High Point, N. C.
401 Wachovia Building

The Priceless Ingredient

"In the city of Bagdad lived Hakeem, the wise man. Many people went to him for counsel, which he gave freely to all, asking nothing in return.

"There came to him a young man who had spent much and gotten little, and said: 'Tell me, Wise One, what shall I do to receive the most for that which I spend?'

"Hakeem answered, 'A thing that is bought or sold has no value, unless it contains that which cannot be bought or sold. Go look for the priceless ingredient.'

"'But what is this priceless ingredient?' asked the young man. Spoke then the wise one, 'My son, the priceless ingredient of every product in the market place is the honor and integrity of him who makes it; consider his name before you buy.'"

—Author Unknown

The advice given by Hakeem is just as sound today. It applies with special force to the purchase of cotton yarns where so much depends upon the honor and integrity or the manufacturer.

The name "Quissett" has for years stood for the highest principles of manufacturing and business conduct.

Carded and combed Cotton Yarns in all Numbers and Descriptions.

Ply Yarns our Specialty. Egyptians, Sea Island, Peelers, Sakelarides.

Quissett Mill

New Bedford, Mass.

Wm. M. Butler, President, Edward H. Cook, Treasurer, Thos. F. Glennon, Agent

QUISSETT MEANS QUALITY

A Goods in Process Routing and Handling System for the Hosiery Mill.

EDITOR COTTON:

There is a woeful lack of system and uniformity in the hosiery manufacturing industry. Other industries are well standardized, and have their manuals and textbooks from which a beginner or any superintendent in the remotest corner of the industry may learn the fundamentals of his work, at the same time feeling assured that he is not burdening his brain with a collection of dead and obsolete ideas. Not so with the knitting industry, or at any rate, not in the seamless hosiery end of it. There is not a textbook published that is of any practical value to a knitting mill superintendent, nor seldom is there an article published that is anything more than theory, unless, perchance, some practical mill man has the time, the inclination, and the ability to write his experiences—and the combination of a practical knitter and a good writer is indeed rare.

Go into any dozen hosiery mills and you will find as many different systems in use. Change superintendents in a given mill, and the chances are ten to one that you will change systems. Even fixers all have diverse opinions, for instance, as to how best to set the cams for a certain fabric. Each dyer has his own pet formula and will swear by all that is good and bad that it is the only method that will get results. He is getting a deeper, or richer, or more "bloomy" black than any other dyer has ever been able to produce; his light shades are more level; his re-dyes are fewer; all as a result of his favorite formula. Consult another dyer and he will claim the same results with *his* formula. One is a firm believer in a gentle boil; another is equally positive that good hard boiling is the secret of good dyeing. One contends that this chemical should be added first, another that it should be last. And so it goes.

When I say this industry needs standardization, I do not mean that every mill man should follow a "cut-and-dried" system devised by some theorist who probably never was inside of a knitting room; but I do mean that what is good for one mill should be good for another in the same circumstances.

A factory is a huge automatic machine, producing quantity and quality of product in direct proportion to the proficiency and regularity of the individual operatives. One tooth broken from a series of gears will stop the whole machine. Likewise one inefficient worker, or even one broken or defective needle in a machine, will often spoil the product of the mill.

We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packing and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promptly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

From the foregoing we can readily see that the chief object of any system of routing and handling the goods in process should be to detect the inevitable mistakes in order that they may be remedied. Not only the reputation of the man in charge, but even the profits of the mill, depend upon how well this is done. The success or failure of a system depends in great measure upon the readiness with which the system shows, in any department of the mill, by what operator or what machine a defective hose or other article was made.

The system outlined below, which is the outcome of twenty years in the hosiery business, can be explained in a few words, and can be installed with little difficulty in any mill where it is applicable.

It is as follows: Procure enough dye-net bags, size 24 x 48 inches, to keep all work in process sacked up. This begins with the knitter, who keeps the empty sacks in readiness and sacks up his daily production eight dozen to the sack. In our case ten of these bags make up a lot for the dyehouse. The number of dozens, however, could be varied to suit the weight of the goods.

Before the hosiery is put into the bags it goes through the first inspection and is turned, all imperfect ones being mended and placed back into the dozen from which they came. Identification marks are made by means of the fashion marks attachment, each set of machines being set to make a different number of these marks. This obviates the necessity of placing a tag on the goods at the knitting machines.

Since the goods are inspected and turned right at the knitting machines, they are now ready for the looper. The looper after finishing a bag of hose, ties a small brass check securely to the bag. As the second inspection is done by women who inspect for certain loopers exclusively, this one check is all that is needed. After the final inspection the goods are taken to the dyehouse in the original sacks.

The Banner

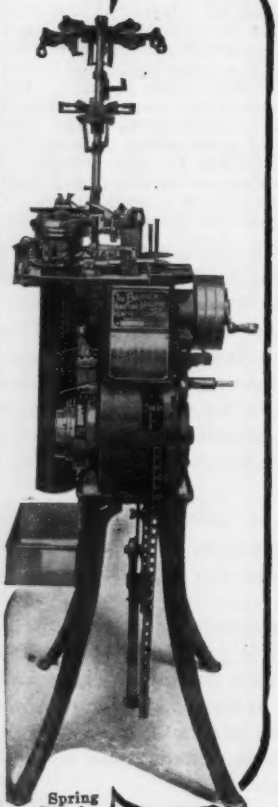
Full Automatic Hosiery Machines

Simplicity
Quality
Speed
Production

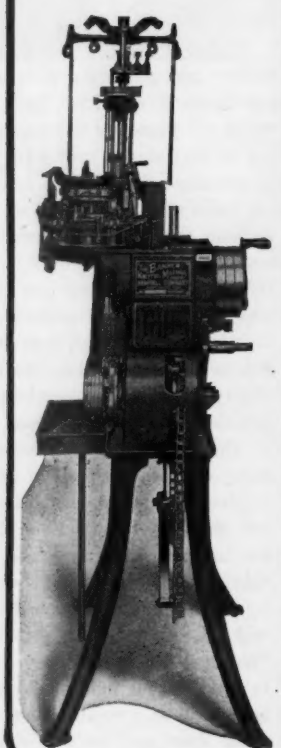
All Parts Accessible from the Front of Machine

We have just placed on the Market two new models– The Spring Beard Needle, built in sizes of 3" to 3 3-4" diameter, and a new model –Split Foot Machine, built in sizes of 3 1-4" and 3 1-2" diameter.

Write for descriptive catalog



Spring Beard Needle Machine



Split Foot Machine

HEMPHILL COMPANY

MAIN OFFICE AND FACTORY PAWTUCKET RHODE ISLAND

TRADE MARK

SOUTHERN OFFICE and SHOW ROOMS 912 James Bldg. CHATTANOOGA, TENN.

PHILADELPHIA OFFICE and SHOW ROOMS 208-9-10 COLONIAL TRUST BLDG. PHILADELPHIA, PA.

At this point a little more effort is required than would be needed with the old method, in that it is necessary to make out a dye card for each sack. The number on the brass tag, as well as the knitter's number, is copied onto the card, and thereafter this bag of hose is considered and treated as a separate lot, the card following it through the finishing room.

Of course the bags are discarded in the boarding room and the goods are stacked on the board in the usual manner. The only difference from this point on is that eight dozen are treated as a lot, and a complete record is kept of them. The dyer upon emptying the bags hangs them up for a few hours to dry and then returns them to the knitters.

The advantage can be readily seen. Here the superintendent has before his eyes a graphic record of each knitter and looper. Bad work found in any part of the mill, up to the time it goes into the boxes, can be traced back to the knitter, looper and inspector through whose hands it passed.

This system will appeal to the knitting room foreman, as well as the superintendent, for without some such system many is the time he must search for hours to find a little imperfection in knitting that will not show up until the goods reach the finishing room.

I do not claim that the method here outlined is infallible, or that it is perfect, or even that it is applicable to every mill and all conditions; but I do claim that it is practice and not theory, and trust that it may prove helpful to my fellow mill-men. R. B. E. (S. C.)

Overcoming Soiled Spots on Underwear.

EDITOR COTTON:

Through the element of human labor, which is as we all know prone to mistakes and oftimes gross negligence, every manufacturer of underwear must contend with soiled spots on underwear. This often holds the shipment of some particular customer's rush order, and in addition puts the manufacturer to the added expense of washing what should already be completed merchandise.

The causes may consist of any of the following:

Dirty floors, and not paying particular attention to this seemingly small detail. While floors will, through necessity, become soiled during the day's work, there is no good reason why oil or grease of any kind should be allowed to stay on the floor of any workroom.

Piling too much upon trucks so that the garments stick over the sides and become a sweeper of all they come in contact with, and with the added possibility of falling upon the floor or machines as they are pushed along.

The carelessness of the operators who, when oiling their machines, use the oil too freely, and throw some upon the parts which come in direct contact with the garments. This can be lessened by having the boards all carefully cleaned at regular intervals.

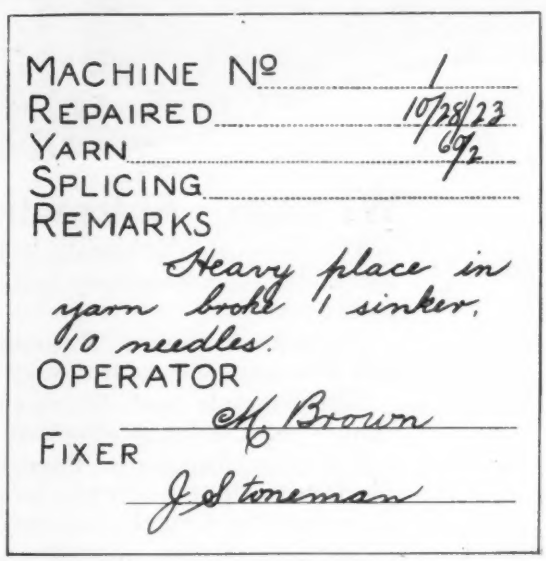
Very often guards are not sufficient, and it is necessary to make additional guards out of tin which any machinist can shape as desired. They will catch the oil that is thrown by the rapidly revolving machinery. I have in mind a particular case where spots were showing on the finished underwear, and the quantities seemed to be increasing without anyone seeming to know why. Every manufacturer, I suppose, sends his job ticket through with each particular lot, and upon discovering oil spots he can, by taking this tag and tracing back to the machine that finished the work, discover the cause. In this particular case, the guards were not fitting properly and were standing out from the machine. After this was corrected there was a great difference noted with reference to the quantity of soiled work.

Summing up all the facts, it is a case of being continually on the alert, and eliminating the causes, together with carefulness on the part of the employees and the watchfulness of the machine repair man who is always in touch with the machines, and the untiring supervision of the department heads and general supervision of the superintendent, who also holds the department heads directly responsible. L. D. W. (Pa.)

Checking Up on Machines and Operations.

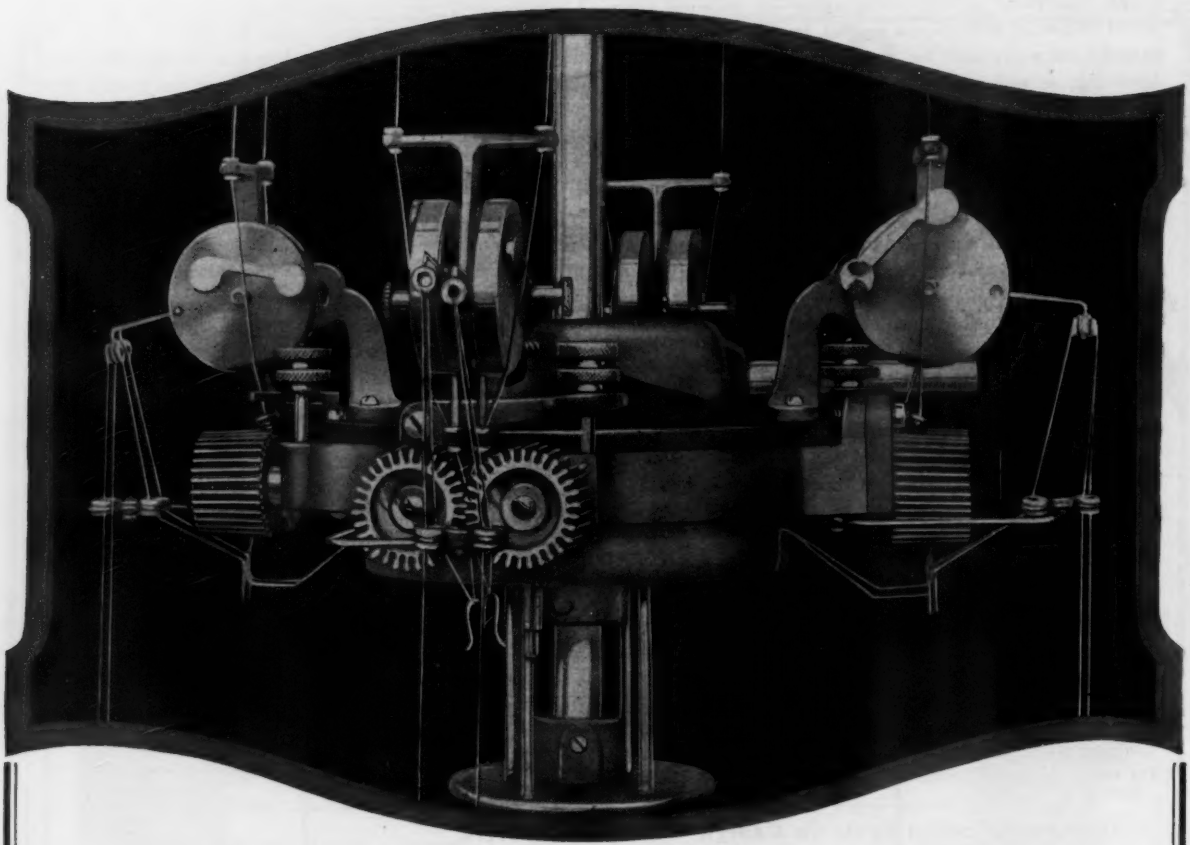
EDITOR COTTON:

I have found that it is an excellent idea to have each knitting machine numbered, and to furnish the fixer with a card on which he records each repair to a machine, using the number, giving the cause of the breakdown, and the date. These cards are filed in numerical order, and at the end of the month the superintendent can see how the operator on any machine is working, and if any particular machine is so worn as to cost more in time and production lost than it is worth, and whether it should be scrapped. Sometimes by transferring operators a different result can be secured, showing in that case that a careless operator was partly at fault.


MACHINE No. 1
REPAIRED 10/28/23
YARN 60/2
SPLICING
REMARKS
Heavy place in yarn broke 1 sinker, 10 needles.
OPERATOR
H. Brown
FIXER
J. Foreman

A copy of the card used for this purpose is shown herewith. S. D. P. (Pa.)

A brochure containing some helpful general and specific information regarding the chemical products manufactured by them has been issued by Bosson & Lane, whose works and offices are at Atlantic, Mass. Much applicable data of use to the finishing department head is included, and copies will be sent to those interested.



Wildman Automatic Furnishing Wheels

The preventing of streaks in the cloth can only be accomplished by maintaining absolutely uniform tension on the yarn as it is fed to the needles.

Wildman Automatic Furnishing Wheel Unit ends all trouble and defects in the cloth arising from unequal yarn tension.

The principle upon which this device operates is exceedingly simple yet absolutely effective.

Wildman Automatic Furnishing Wheels are invaluable for plating, as the tension can be controlled for each yarn and uniformity of plating thus assured.

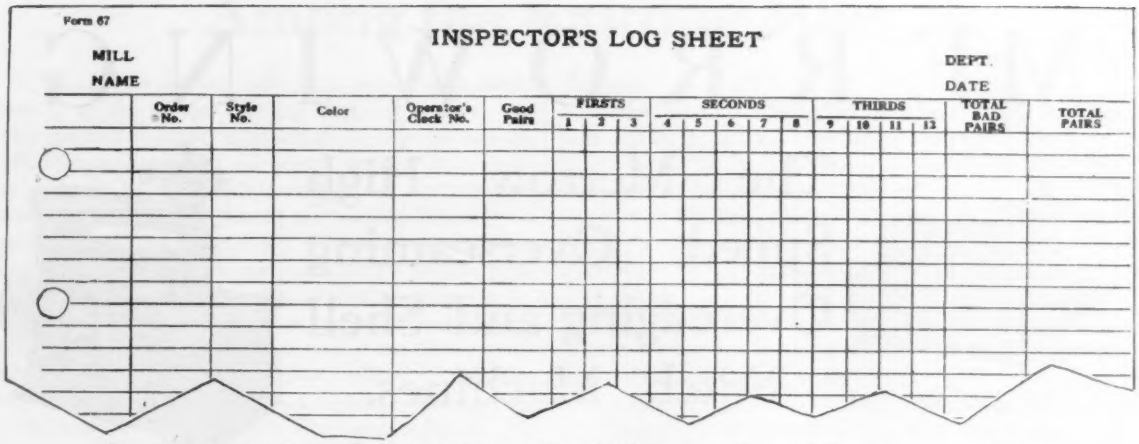
Let us send you full information on the Wildman Automatic Furnishing Wheel Unit.

We have issued a very complete and informative book, "The Science of Knitting"—Price $3.00

TRADE MFG MARK

WILDMAN MFG. CO.

NORRISTOWN, PA.


Form 67

INSPECTOR'S LOG SHEET

MILL NAME

DEPT.

DATE

Order No.	Style No.	Color	Operator's Clock No.	Good Pairs	FIRSTS 1 2 3	SECONDS 4 5 6 7 8	THIRDS 9 10 11 12	TOTAL BAD PAIRS	TOTAL PAIRS

FIG. 1. THE LEG INSPECTOR'S LOG SHEET. 9½ x 11 INCHES IN SIZE AND PERFORATED FOR FILING.

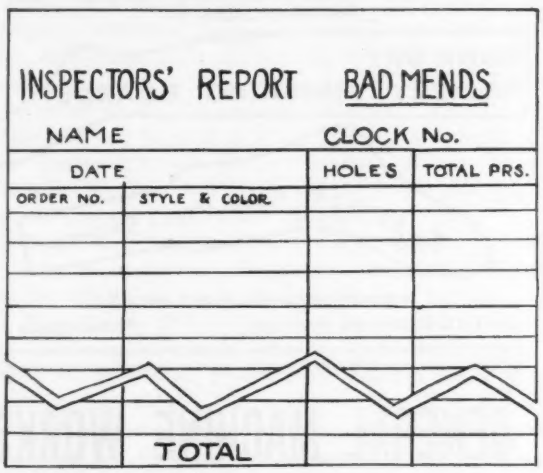
Cutting Down Seconds and Bad Work.

EDITOR COTTON:

Here's another suggestion for knitting mill managers inspired by the one from "O. T." in the September issue of COTTON.

It is our experience that the best way to cut down percentage of seconds or bad work is to find out where the damage is done, and then to go right after it. To accomplish this "finding out" we have developed a system with three forms for three different stages of the work.

The first one is the leg inspector's log sheet, shown as Fig. 1 herewith. These inspectors look over work after it has been legged and before footing. Their log sheets


INSPECTORS' REPORT BAD MENDS

NAME CLOCK No.

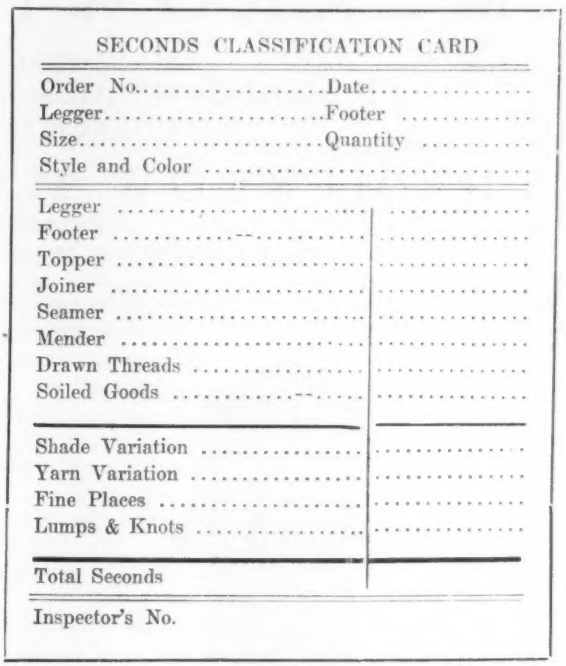
DATE		HOLES	TOTAL PRS.
ORDER NO.	STYLE & COLOR		
	TOTAL		

FIG. 2. INSPECTOR'S REPORT FOR BAD MENDS.. SIZE 4 x 11 INCHES.

give information by machines in regard to style, order number, number of pairs to be replaced, number of pairs to be mended and number of pairs to be cleaned. In this way a close check is kept on all leggers.

The second form (Fig. 2) is the report of holes left in finished hosiery after mending. This report is made by the inspectors and shows the bad work passed by each mender, order number, style, pairs bad, total number of pairs.

The third report is a seconds classification card (Fig. 3).


SECONDS CLASSIFICATION CARD

Order No.....Date.....

Legger.....Footer .....

Size.....Quantity .....

Style and Color .....

Legger	
Footer	
Topper	
Joiner	
Seamer	
Mender	
Drawn Threads	
Soiled Goods	
Shade Variation	
Yarn Variation	
Fine Places	
Lumps & Knots	
Total Seconds	

Inspector's No.

FIG. 3. SECONDS CLASSIFICATION CARD.. SIZE 3¼ x 5¾ INCHES.

One is made out for every bundle inspected, giving order number, style, legger, footer and seconds caused by every operation as well as soiled goods, "mismatched" goods and yarn causes, either variation or winding faults.

All three of these reports are combined and recapped to show:

(1) Each style separately, its seconds by causes.

(2) Each machine, its seconds by styles.

(3) Each mender, her poor work by styles.

Since the installation of this system our seconds percentage has decreased to a surprising figure.

J. D. R. (Mass.)

No team can win a game unless the members play together; no plant can reduce its "seconds" without team work.

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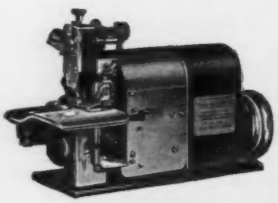

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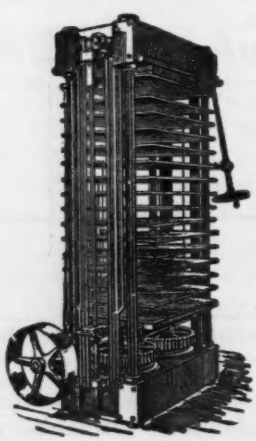

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Cylinders and Dials

Among the Knitting Mills

A 500-machine knitting mill will be established in Rome, Georgia, by the Chester Knitting Mills, of Chester, Pa., which operates a number of plants throughout the country. J. H. Rickman, president and general manager of the company, was in Rome recently arranging for the letting of contracts for the renovation of the building formerly occupied as the Printup warehouse, which will be used for the knitting mill. Some of the equipment for the Georgia plant will be brought from Collinsville, Illinois, according to Mr. Rickman, where the company has been operating a plant. Some time ago, he said, the employees of the Illinois plant walked out because the management refused to recognize their union, and when they refused to return, the plant was closed, and the equipment will be moved to Rome. The daily capacity of the plant will be 2,000 dozen pairs of children's and women's hose, when present plans are consummated.

The Carter-Collier Company is adding 25 knitting machines, 25 sewing machines and new bleaching equipment to its Barnesville, Ga., plant.

The Carrollton Knitting Mill Company has been organized at Carrollton, Ga., for the production of knitted fabrics. Pomp Shafer, of Carrollton, is interested.

Ellis County Hosiery Mill, Waxahachie, Texas, has been incorporated with a capital of $50,000 by W. D. Ballard, William Maloney, and Dr. W. B. Jackson.

The Mitchell & Frank Knitting Mills, Buffalo, N. Y., plan the construction of a new three-story-and-basement mill, 75 x 200 feet, all equipment therein to be electrically operated.

The Block Manufacturing Company, underwear manufacturers, will move their main factory from Baltimore, Md., to Wilmington, N. C., it is stated. This follows successful tests with an experimental factory at Wilmington as a branch plant. The company makes men's and women's underwear, and the plant at Wilmington will be operated as the Southland Manufacturing Company. William Block heads the company, and the North Carolina branch plant has been managed by his son, Nathan Block.

The Wilkes Hosiery Mills, North Wilkesboro, N. C., recently occupied their new plant, a two-story building costing $25,000. P. W. Eschelman is general manager.

Olive Hosiery Mill, Shelby, N. C., is enlarging its plant and increasing equipment. The space for knitting machines will be doubled, the dye plant enlarged and a yarn storage house added. The capacity of the plant will be 1,500 dozen pairs of hose a day when additions planned are completed. D. W. Royster is manager.

Thomas Reifsnyder, owner of a hosiery mill in Lancaster, Pa., has started a branch plant at Reamstown, Pa., with 30 knitting machines, 10 ribbers and five loopers.

The Pohatcong Hosiery Company, Washington, N. J., has begun work on a three-story-and-basement addition, 50 x 125 feet, which will double the present capacity. An addition to the boiler house will be constructed also, and the company plans the manufacture of half-hose in addition to the present line of women's hose, it is stated.

The Algro Knitting Mills, Inc., West New York, N. J., have been formed with a capital of $125,000 to operate a knitting plant. Newman and Alexander Grodnick head the company.

Dryad Mills Co., Dover, Del., has been incorporated to manufacture underwear. The capital is $100,000, and F. D. Tillotson, M. W. Morton, and J. L. Norrell, of Winston-Salem, N. C., are the incorporators.

Obstfelt Brothers, Chicago, Ill., organized to manufacture knit goods, have leased a three-story building at 1305 Milwaukee Avenue, aggregating about 7,500 square feet of floor space.

The Fairfield Knitting Mills, Inc., New York, has been incorporated with a capital of $25,000 to manufacture knit goods. The company is headed by H. H. Meyer, M. Berman and A. A. Goldstein. It is represented by H. J. Cohen, 51 Chambers Street, New York.

The Ballston Knitting Co., Ballston Spa, N. Y., has tentative plans under consideration for the construction of a new branch mill on Main Street, Stillwater, N. Y., to be three-story, 56 x 75 feet. It is estimated to cost close to $40,000, including equipment. Work is expected to be commenced early in the coming year.

The Famous Fain Knit Goods, Inc., New York, has leased property at 120 East Fordham Road, corner of Creston Avenue, for a period of years, for a new local works.

The Mercantile Knitting Mills, Inc., New York, has been incorporated with a capital of $12,000, to manufacture knit goods. It is purposed to commence operations at a local plant in the near future. The company is headed by S. Stein and S. J. Covit, and is represented by L. Cohen, 299 Broadway, New York.

The Chester Knitting Mills, Inc., St. Louis, Mo., has foundations under way for the erection of a new branch mill at Charles City, Iowa. A list of machinery to be installed will soon be arranged.

The Lengel-Fencil Co., Reading, Pa., operating a local knitting mill, has purchased the plant of the Gilt Edge Hosiery Mills, and plans to occupy the property at an early date for general expansion.

The Lynwood Knitting Co., Wilmington, Del., has been formed under state laws with a capital of $10,000 to operate a knitting mill. Arrangements for the plant will be perfected at an early date. The company is represented by the Capital Trust Co., of Delaware, Dover, Del.

The Wearever Knitting Mills, Inc., New York, has been organized with a capital of $25,000, to operate a local plant for the manufacture of hosiery and other knit goods, for which plans will mature at an early date. The company is headed by J. Drosian and M. Tannenbaum. It is represented by M. Blumberg, 922 Broadway, New York.

The Alpha Knitting Mills, Inc., 570 Thirteenth Street, West New York, N. J., will soon commence work on extensions and improvements to provide increased facilities for manufacture. The company's plant is located at Jackson Avenue and Thirteenth Street. H. Anderson, 242 Fulton Terrace, Cliffside Park, N. J., is architect for the work, which is estimated to cost about $17,000.

The Garden Knitting Mills, Inc., Brooklyn, N. Y., recently organized, will operate a local plant. The company is headed by F. Dashkind and L. Shifrin. It is represented by Samuel Fish, 32 Court Street, Brooklyn.

The Crescent Mfg. Co., Winona, Minn., has acquired the former mill of the Hand Knit Hosiery Co., Two Rivers, Wis., and has plans for extensions and improvements under way, including the remodeling of the existing structure. The new owner will equip and occupy the plant for the manufacture of cotton yarns, etc. It is proposed to establish a knitting mill department in the near future, utilizing a portion of the present structure for this purpose.

The Arcadia Knitting Mills, Inc., 60 Broadway, Brooklyn, N. Y., has arranged for an increase in capital to $100,000, for general expansion. The company is operating a branch mill at 473 Kent Avenue.

The Peter Pan Knitting Mills, Inc., Brooklyn, N. Y., recently organized under state laws, will operate a local plant, for which arrangements will be perfected at an early date. M. B. Sherr and S. Siegell head the company, which is represented by Sherr & Gross, 78 Graham Avenue, Brooklyn.

The Jay-Arr Knitting Mills, Inc., Brooklyn, N. Y., has filed notice of increase in capital from $10,000 to $30,000 for general expansion in plant and operations.

The Yarn Market

Latter October offered nothing in the way of variety from the standpoint of business conditions in the Philadelphia cotton yarn market. Prices seemed to continue at rest, while business was still sluggish and acting on the hand-to-mouth plan; buyers seemed still preferring to wait it out a little longer, and the result was very little business of moment.

What the sports writers call "dope" pointed to what seemed an inevitable decline in rates. It seemed that offerings on the part of dealers who had bought fortunately, while possibly not sufficient in themselves to produce a break, did cause an irregularity or an instability in the yarn values, and that this effect was accentuated by offerings of smaller mills who had reached or were in sight of the end of their bookings.

Contrary to this calculation, however, was a general feeling of expectancy for a better condition; and a feeling of more or less surprise that the yarn market had remained dormant with general business conditions the country over seemingly on a much better plane. Better yarn business was anticipated for the near future.

The advent of November proved the latter theory the more correct, and also demonstrated that the dope bucket can be upset in the yarn market just as it is upset in baseball and on the gridiron. The government's report as of November 2 brought on a jump in raw cotton, in the wake of which occurred a rise in the rates on carded yarns, the increase in cotton being ascribed as the cause of the higher rate in yarns.

This boost preceded what developed into a healthy, two-weeks' session of increasing prices, which elevated representative carded numbers up by some four and five cents. Yarn consumers seemed also to cast aside their policy of watchful waiting and inquiry and good business came into being.

It was indicated that the awakened interest of buyers was not caused particularly by the government figures, but more especially by the continued ability of raw cotton in acquiring strength. Business extended from the immediate-need condition to a point where orders were being placed for operation into the first quarter of the new year.

With buyers taking up their lagging interest in a more or less cautious manner, combed yarns also began to renew life and activity during the first part of November, and consumers were paying higher rates for them, especially on the coarser counts.

The effect of these stronger conditions was felt also in weaving yarns in this market, which also went to higher price levels, and, it was reported, received some added interest on the part of consumers.

There was a point for discussion as to whether, in the face of the acquired strength of cotton and its resultant effects, it would be wiser to enter into the new year with short stocks of yarn, or to disregard the practice of holdat existing rates was still below the average parity with cotton, and therefore should be considered as a good investment.

A continuance of the better condition, with a firmer foundation and easier economic situations generally, was expected by factors in this market.

Following are quotations on the Philadelphia market for November 16:

Single Skeins.

4s to 8s	48	10s	49
12s	50	14s	51
16s	52	20s	54
24s	56	26s	58
30s	59		

Single Warps.

8s	50	10s	50½
12s	51	14s	52
16s	53	20s	54½ @55
26s	59	30s	60
40s	69 @70		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack	49½
8 3-4 tinged tubes	46
8 3-4 hard white warps-twist	47½
8 3-4 hard twist waste	46

Two-Ply Skeins.

8s	50	10s	50
12s	50½	14s	52
16s	53	20s	55
24s	58	26s	57½ @58
30s	59½ @60	40s	69 @70

Two-Ply Warps.

8s	51	10s	52
12s	53	14s	54
16s	55	20s	56
24s	58½	26s	60
30s	60 @61	40s	70 @71

Frame Spun Carded Yarn on Cones.

8s	48½	10s	49
12s	49½	14s	50
16s	51	18s	52
20s	53	22s	54
24s	55	26s	56
30s	58 @59	40s	68
30s double carded			60
30s tying in			56 @57

Two-Ply Combed Peeler Skeins and Warps.

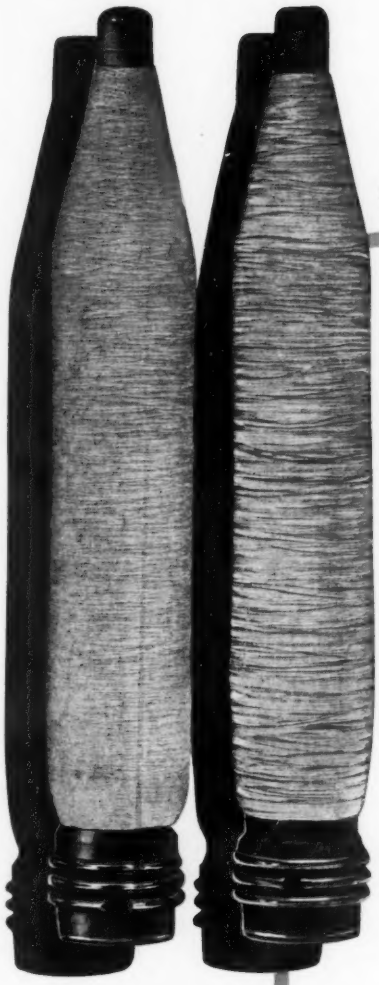
8s to 16s	65	20s	67½
24s	70	30s	75
40s	82½	50s	87 @90
60s	97 @1.00	70s	$1.10
80s	$1.25		

Mule Spun Carded Yarn on Cones.

10s	52	12s	52½
14s	53	16s	53½
18s	54	20s	55
24s	57	26s	59
30s	63	40s	73

Mule Spun Combed Peeler Yarn on Cones.

10s	56	12s	57
14s	58	16s	60
18s	61	20s	62
22s	63	26s	68
28s	69	30s	71
36s	73	38s	78
40s	80		



The bobbin on the right is spun with 1⅜" ring for shuttle. The Universal wound bobbin on the left contains the amount of filling spun with 2" ring. It has been inspected and perfected to reduce costs and protect values in weaving.

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REG. U.S. PAT. OFF.

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THE ideal mill spins to spinning limitations rather than to shuttle capacity,—spinning warps and filling yarns with same size ring, warp bobbin filling built; thereby gaining flexibility of spinning equipment and saving doffing time and labor costs.

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The Knit Goods Market

One conclusion to be drawn from the amazing conditions in the cotton knit goods markets last month is that there were more goods in stock than manufacturers had been willing to admit existed. This deduction may be arrived at from the fact dealers were able at all times during the steady rise in yarns to supply their wants at less than replacement. Prices on almost all lines had been advanced—some only slightly—but buyers for jobbing houses seemed to have no difficulty in finding about what they wanted at the former figures. This was admitted by manufacturers themselves, and their explanation was something like this: "Well, others are selling at pretty nearly what dealers offer and we must meet their prices, accumulate goods or shut down our factory."

This applied more particularly, of course, to staples, but extended also to certain high standard goods. Small manufacturers were struggling along in the hope of holding their trade and working organizations until there develop demand sufficient to enable them to at least break even. It costs money for a manufacturer in the smaller, not financially strong class, to close his mill, and well do buyers know it. When a mill suspends temporarily banks call that mill's loans. So the little fellow goes plodding on, striving to pay Peter out of what he may get from Paul, although what Paul buys may show a slight loss.

Unless there shall be early improvements in the situation the manufacturer pursuing the policy referred to will do what he would be justified in doing now—divert his building, machinery and efforts to other lines of endeavor. He would have saved himself considerable worry had he done so a month or two ago. But few men of the stamina that has built up the hosiery industry are willing to give up until forced by circumstance. And so we continue turning out hosiery faster than the distributors are willing to take it.

Selling at and under replacement cannot go on indefinitely. When it has been halted, as it must be, the resultant diminished production will start a reaction that will in great measure compensate the survivors of one of the sharpest hosiery market struggles witnessed in years. Most of us, while trying to fool the other fellow, have fooled ourselves. Now there is a strong tendency toward describing things as we really see them, and in the end more nearly absolute frankness will be found to have been an improvement over the closing of one's eyes to facts.

Some of the northern underwear manufacturers who, in the last year or two, were pinched out turned to the making of sweaters, bathing suits and other textile lines classed as knitted outerwear, and now many of those who had established business in such lines are complaining, and representing that "interlopers are ruining our business."

In all probability sweaters and bathing suits will be over-produced to about the extent as was hosiery and underwear, but that is a matter of competition and may be left to the future. Knitted outerwear manufacturers for years, in the exploiting of their product, shouted from the housetops that the popularity and utility of the sweater coat was shown in "an undeniable increase in public demand." The pinched-out underwear manufacturers took them at their word and proceeded to play a part in supplying that demand. But even now, it frequently is asserted in the trade, there is excess underwear production. On the basis of recent distribution there is.

What may be in store for the poorly equipped hosiery manufacturer without the means or faculty for bringing out successful innovations is indicated in the admission of an executive of one of the larger mills that several of its numbers are being sold at a known loss and that prices of wool hosiery for the winter of 1924-5 are under the figures which prevailed for the current season, notwithstanding most wool hosiery comprises a fair proportion of cotton and that both wool and cotton are too high to justify recessions in the prices of finished products.

It is the theory of this manufacturer that lower prices will sell more goods; that he believes it possible to so increase his sales that the diminished overhead will leave a profit where losses now are taken, and that inability of some weak rivals to compete will eliminate them from the survivors and that this excess production gradually will be reduced to a level more evenly balanced with consumption.

The lower prices for next year's wool hosiery, announced by several concerns, are perhaps attributable to a ten per cent mark down by one of the larger English manufacturers selling extensively in our domestic markets. Announcement of this reduction was made several weeks before the American manufacturers came out with the downward revision. As British interests are paying less for the wool they consume and less for the labor employed, it is apparent that in certain lines of hosiery there is to be considered the matter of competition with foreign interests as well as among domestic mills.

Cotton hosiery manufacturers are not alone, of course, in having to wrestle with volume production during a period of declining, or suspended, distribution. A cotton cloth used for lining for certain manufactured products was offered at a cent a pound less in November, with cotton at 34 cents, than it was bought for in August. A cotton household article is being sold at prices based on 45-cent yarn, with the identical yarn commanding ten cents a pound more. Cotton hosiery, obtainable on a basis showing a like price disparity, might reasonably be assumed to be easily movable to jobbers. They now are offering prices which they refused to pay a short time ago, and it seems certain that before they have provided for their early 1924 needs they will be paying prices which they now are resisting. So with manufacturers it is a matter of waiting.

There is wide divergence of opinion as to the expediency of taking wool hosiery orders this early for deliveries eight months hence, for there is some question whether this class of stocking will be as popular for the next season as it was. Some interests figure on an increasing use of silk hosiery for all-year-round wear, as a result in part of the intended wide publicity to be given to silk goods by full fashioned interests. Aside from this, there is no denying that women have a weakness for the snug fitting silk stocking.

But silk hosiery manufacturers have their problems no less than have the cotton stocking makers. While $13.50 to $14 a dozen is regarded as low a price as can be legiti-

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mately named for full fashioned silk boot goods, there are one or more lines on the market at around $12, a leading primary market operator says, and he does not claim they can be classified as distress goods. For several weeks he has been experimenting on a $12 stocking.

As a competitor of the low price all-silk boot stocking is the silk and artificial silk in twist. A Philadelphia mill is having success with such a line of full fashioned at $10.50 to jobbers. By some it is regarded a better retail proposition at $1.75 a pair than the all-silk boot at $2, which is what dealers are assumed to get for the Berkshire Knitting Mills number for which jobbers are contracting at $13.85. It is understood the Berkshire's bookings for the first six months of 1924 are in larger volume than they were for the last half of the present year. Some little time will, of course, elapse before jobber specifications come through, but it is indicated chiffons will be wanted for the earlier deliveries. These, however, have been popular in only given localities. For example, Philadelphia is a poor chiffon market, and the same is true of Boston. New York, Chicago and the Pacific coast cities take kindly to them.

In recent weeks there were better markets in Western New York, the Central West and on the Pacific Slope than in either Philadelphia or New York for practically all classes of staple hosiery, notwithstanding reports of the backwardness of Chicago jobbers about stocking up for spring.

The situation as to silk hosiery is decidedly spotty. At least one of the smaller Philadelphia full fashioned mills has been running to capacity with a double shift of operatives. Some were busy with a single shift, and a number were using less help and easily keeping production abreast with shipments, and a few were barely moving. This is true also of seamless mills, in which output as a whole was estimated at 50 per cent of capacity, some mills, however, being engaged full tilt. It was noted that the stronger demand was for spring needle and split sole goods. Several mills selling only a few large accounts are in the strictly busy class and making money. They seem to have standardized their product and favored with a clientele that attaches more importance to merit and uniformity than the matter of a quarter or half dollar more a dozen.

Jobbers, and retailers as well, continue to operate ultra-cautiously in silk hosiery, buying for only a few weeks needs. Since the first of September they have seen raw silk decline from around $12 a pound, a level to which speculators carried it following the earthquake in Japan, to about $8, and necessarily there is a question whether the decline has run its course. On the other hand, they have seen cotton advance as much, on a per centum basis, as silk slipped back in the same period, and again there is hesitation. So that it would appear there is an element other than price that is holding the distributor down to commitments for immediate requirements. As illustrating the strong preference for homoeopathic quantities, a representative jobbing house placed a hurry order for less than twelve dozens of assortments of full fashioned silk half hose at a special price of $7, an investment of about $80. Mills are selling more broken cases than in a long time, and not infrequently a large jobbing house will limit an order to 30 dozen pairs, about enough to see a metropolitan retailer through a busy Saturday's selling.

There has been fairly steady good buying of misses' combed ribs of 300 needles and finer, but at the prices which were named in August, $1.75. Advances were made a month or more ago, but few mills are getting them, except for deliveries after January 1, on which a low quotation is $1.80. This is five cents a dozen under replacement on the present yarn market. A Philadelphia mill making a somewhat distinctive line of mercerized ribs is selling at around a quarter above the common quotations, and is employing more help—all it can get—than in any previous month this year. The mill is selling in only small quantities for practically spot deliveries, and is accumulating neither stock nor profits, according to the executive.

A double carded fine gauge rib masquerading as combed is on the market at $1.70 a dozen and has had the effect of holding strictly combed down to summer prices. In comparison it stands out as a poor imitation or substitution. While not a big seller, it is used by jobbers for battering prices of combed ribs.

At the ridiculously low prices, combed ribs in staples have had a good season in competition with the derby and drop stitch in seven-eighths length with fancy top. The latter have been one of the stronger sellers for the next season, and most mills making the more fetching patterns are busy on orders. In this respect they are on a par with some of the mills making infants mercerized, combed and fiber socks, orders for which were received so late that some manufacturers, to get deliveries off as per specifications, had to enlarge their work forces, at least one adding machinery for increasing production by 500 dozens a day. Thus there is revealed a spotty condition in hosiery which enables some manufacturers to say in all sincerity that business with them is satisfactory, while some others are on the verge of distraction over want of business at prices at which they might break even.

While some manufacturers of infants' socks are operating at capacity, perhaps two of them sold up, practically for the season, and one getting an advance of 10 cents a dozen for mercerized and 75 cents more for ingrain all fiber, there are lots of a few lines to be had at a material sacrifice to makers. A well known house offered a lot of 1,000 dozens at $1.30, which was all of 20 cents under the market, and buyers had the temerity to offer $1.25. The goods were offered after initial orders had been placed and before more than a handful of jobbers had repeated. A mill with considerable stock is holding out for $1.45 for a line which was sold at a nickel more, and the management say there is little doubt the goods can be sold at their value when jobbers come back to fill in.

Mercerized hosiery for women is not in sufficient demand to enable mills to obtain even fractional advances. A line here and there may be selling, on reputation, but the run-of-mine is draggy. A well made 260-needle stocking offered last month at $2.85 a dozen attracted no attention. "We do not seem to be able to sell it," the mill representative said, stating that anything between the cheap stuff and the featured stands little show of moving at anywhere near value.

Mercerized half hose is in about the same position as ladies', with some few mills getting fair size orders at low prices. One manufacturer some weeks ago booked an order for 10.000 dozens, and, although he had specifications as to 3,000 dozens, he had not covered for yarn. He was in the

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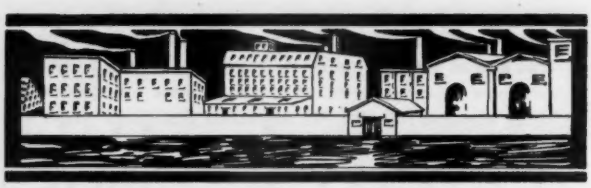

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Incorporated 1890

market for 40/2-ply mercerized combed peeler and had it offered to him at a dollar a pound, replacement now probably $1.25. At last accounts he was waiting for a decline in yarn for making up 7,000 dozens of the stockings, assuming the order sticks.

Some orders for hosiery owned by jobbers under contract at well under current quotations are not sticking. Only recently a commission house had an intimation from a jobber that it was his intention to cancel. He asked for deferred shipment of misses' coarse gauge ribs bought at $1.05 a dozen. The seller promptly advised him that he regarded the request preliminary to cancellation and that unless specific instructions be received immediately the goods would go forward as per order. In this instance cancellation was halted by the aggressive attitude of the seller.

It is understood most of the recent cancellations were from distributors who had overbought and who arranged with mills for amicable disposition of their troubles. In one instance a large western house, known to have bought liberally in the Spring and suffered disappointment in its volume of sales, submitted a proposal for cancellation rather than put its surplus goods on the market at distress prices. While this treatment of the case left the mill, instead of the jobber, with the surplus, the former was spared the confusion which would have followed a break in its price. As usual, the manufacturer carried the basket for the distributor.

Figures from reports of a group of hosiery manufacturers show that in September their cancellations were seven per cent of their shipments, as against 4½ per cent in August. Cancellations since have dwindled, with the advance in cotton, which made merchandise in stock and on order safer property.

Low end carded hosiery logically should be strengthened by the stronger position of cotton, and southern mills will be the chief beneficiaries of the 35-cent level for the fiber. There has been curtailment of output by small mills and the larger, being able to effect a greater per cent of saving in overhead, escaped the making of radical price advances. A North Carolina mill last month announced to the trade a new price of $1.15 a dozen for women's carded 176-needle looped toe goods, an increase of five cents, and a like increase for sewed toe, now $1.10. The same mill advanced looped toe automatic top socks 2½ cents, to 95 cents a dozen. Sewed toe also were moved up 2½ cents, to 90. A few mills are quoting $1.15 to $1.20 for 176-needle looped toe half hose, about one pound to the dozen, others quoting $1.12½, where there is some indication of firmness.

Misses' carded ribs are rated low at $1.10 on size 7, but there is a variance in the rise and fall that makes price comparisons practically valueless, some manufacturers getting 7½ cents rise, while others are taking but five. The same disparity is found in combed ribs. A well-known Tennessee mill is adhering to 10 cents rise and 7½ fall. Jobbers are understood to be placing orders with at least one mill on a rise of 7½ cents and fall of five. This is a matter about which, it would seem, there ought to be no great difficulty in establishing and adhering to uniformity. The variance is one of the ills of the hosiery industry for which manufacturers themselves are responsible.

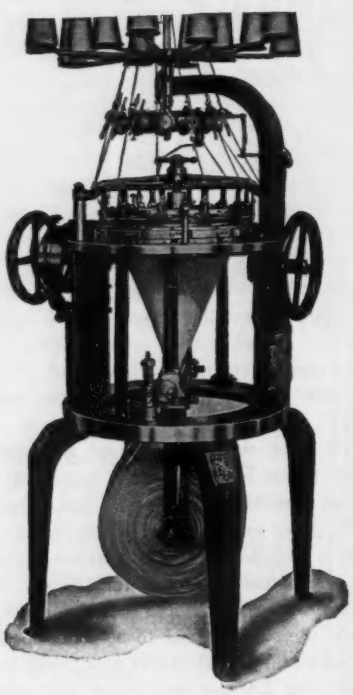
While the direct-to-retailer hosiery mills are not having the usual seasonal volume of business, they are in a better position than the average mill selling to jobbers, it is thought, from the fact they have a more steady flow of orders and, as they distribute their product under nationally advertised brands, dealers have less difficulty in maintaining prices and obtaining slight advances. With one leading retailer mill the monthly sales for Spring show a falling off of around 20 per cent compared with corresponding months for 1922, but this is in large part compensated for by an increase in spot and nearby delivery orders.

In the distribution of unidentified lines manufacturers frequently are the victims of deception for obtaining prices so low as to give retailers exorbitant profits. For example, some weeks ago a jobber wanted a lot of hosiery for a retailer who, it was represented, intended to use the line for a special drive at 75 cents a pair. In the circumstances, the jobber declared, he could not pay more than $5 a dozen, the manufacturer asking a half dollar more. The latter yielded, the jobber got the goods at $5 a dozen and the manufacturer paid the retailer in question 85 cents a pair for the stockings. So while mills are operating, to a great extent, for overhead, replacement being out of the question, the consumer often is paying well above replacement to the dealer.

Perhaps the most flagrant abuse of a manufacturer's willingness to accommodate a store posing as a Good Samaritan was disclosed some weeks ago, when hosiery bought at $3 a dozen as a lot which a manufacturer wanted to dispose of at once for a cleanup was sold at one dollar a pair by the department store to which it was practically presented, and whose buyer had said he could not pay $4 a dozen, as the stocking was to be sold "special" at 50 cents. An underwear manufacturer who found his product ticketed more than 120 per cent above mill price is considering the expediency of stamping the retail price on every garment, providing for a fair profit for both jobber and retailer. If dealers wanted to cut the price, he said, they would be privileged to do so, as is done with patent medicines, most of which, he points out, are sold at less than the price printed on the label.

The jump in cotton precipitated a muddle in underwear. Distributors bought grudgingly of heavy weights for November and December deliveries at the advances made by a number of mills. There was considerable filling in as additional business came along from retailers, but it was represented business in that quarter had fallen under expectations by reason of delay in arrival of snappy weather. There seemed a determination among jobbers generally to buy nothing that had not been practically sold. There was little or no anticipating of probable retailer needs with the shift from Fall to Winter. Where there was quantity buying, it was believed, there had been selling short or jobbers who did buy in bulk looked on existing prices as low enough to justify them in putting some 1923 goods in their bins for 1924-5.

A mill in North Carolina, which for some weeks had been selling at value came out on November 8 with announcement of advances of $1.25 a dozen for 16-pound cotton ribbed union suits and prices proportionately higher on shirts and drawers. Many of the orders which had been placed at value were confirmed at the advance and some new business booked. But what this mill did in the way of taking on more business cannot be accepted as a criterion, as prices are guaranteed to date of delivery and freight



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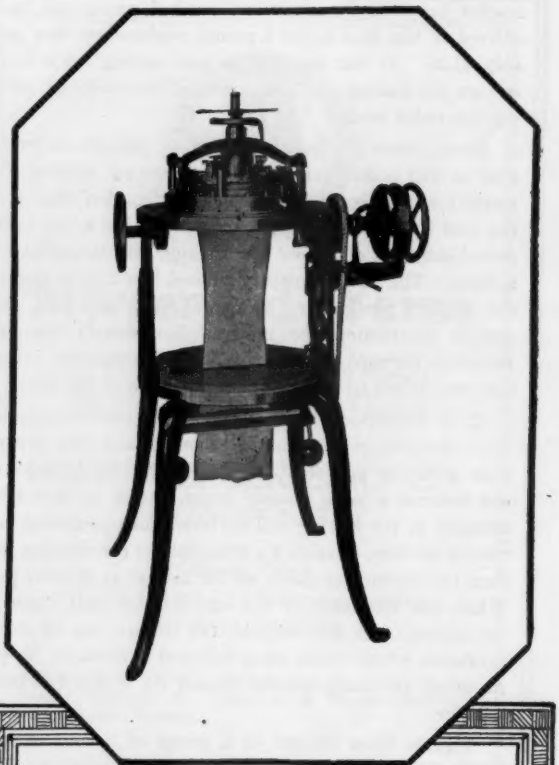

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Philadelphia Pennsylvania

paid to destination, all of this in addition to a trade discount.

In a general way the heavy weight market was soggy. Jobbers in need of goods were paying advances on lines which they had to have for filling retailer orders and keeping stocks assorted as to sizes. But nowhere was there evidence of a willingness to put into stock, goods that might have to be carried in the end-of-the-year inventory, although there were a number of commitments for sub-standard garments to be shipped out during the first quarter of 1924, to go into distribution for the succeeding Winter season. Transactions of this character were in sufficient number to indicate there is a somewhat strong element in the trade that regards current prices safe until, at least, the end of the cotton year.

One underwear buyer reasoned there was as much likelihood of cotton going to 50 cents as declining to 25, and he thought the prices quoted to him must have been based on cotton around the latter figure. So, he said, "I probably will at least come out even on what I buy now, while I may own 25-cent goods on a 35 to 50-cent market." His contract, he said, represented less than 50 per cent of his ordinary requirements, and no matter what direction the market takes in the next few months he will be in position for averaging his cost. But there are comparatively few "sports," as the trade refers to buyers placing advance orders.

While probably every manufacturer of Winter underwear was eager for business last month, at the very tail end of the season for selling to jobbers, there were several who had to decline business in ribbed shirts and drawers. Demand for these, which had not been bought so heavily, relatively, as suits, developed unexpectedly and found some mills unprepared for it. There was no difficulty in getting slight advances on the separate garments, but supplies for deliveries to the end of December were scant, and it was because of this that orders aggregating some thousands of dozens had to be turned down. But of union suits there was no lack, except as to certain branded or otherwise distinctive lines.

In the latter class might be mentioned a Central West mill which still is booking repeat orders at an advance of around 10 per cent. This establishment will have sold more than the average season output of its various numbers ranging from the moderate to the high priced. Its product is men's union suits exclusively.

Speaking of opening for the next Winter, the executive said prices would be named so soon as it could be demonstrated jobbers are ready to buy, this regardless of what other manufacturers may do. The fact that one—perhaps three—southern mills have sold some underwear for 1924-5 does not influence him; for one reason, he does not come into competition with sub-standard lines, which will comprise the bulk of the early sales for the next season.

This mill man would prefer to not come out with prices and samples until about the middle of January, as he believes that by that time it will be possible to figure cost with more accuracy than at present, and further, by the first of the year it is thought, there will be less doubt over the outcome of the European tangle. "While France is talking reparation it is hardly safe for manufacturers here to make preparation," one mill executive said.

While some business in underwear for deliveries to jobbers four to five months hence is being taken, most manufacturers who were willing to state their views confessed they were "up in the air"; that whether they accepted cotton as stabilized at the peak for November or figured on a drop they could operate only speculatively, with the chances perhaps even. But in view of the mistake made in successive years by opening lines while jobbers were undecided, there is practical unanimity of opinion that to accumulate stocks, made from high price cotton, and in the sustained attitude of jobbers, would involve more risk than any manufacturer would be warranted in assuming, "for all that might be in it."

On the assumption that present underwear prices are on the basis of cotton around 25 to 27 cents, a jobbing house buyer whose judgment usually commands as much respect as that of any other person operating in the primary market, says he believes no jobber would be justified in providing for more than 50 per cent of his requirements until, at the earliest, figures as to next year's cotton acreage come out from official sources. "If we bought now and an increased acreage were indicated, some of us would feel sorry," he said, "and doubtless there would be some canceling. On the other hand, if a light planting were indicated we would be sorry we did not buy more. In whatever we do we must take a gambler's chance, with the odds, as I see it, against us, if we buy for full needs."

It was pointed out that by deferring the bulk of the buying until, say, next Spring, mills might suspend operations while waiting for orders, or, in any event make up nothing for stock, with the result that when buyers came to market there would be created a tight situation in which manufacturers probably could get prices high enough to at least compensate them for profits which could not be gotten out of operation during the last quarter of the present year. The jobber thought he would prefer to take chances on getting all the underwear needed than buy it now to carry through another period of doubt. This view, it is believed, will prevail generally in the trade for the remainder of 1923, and there seems a disposition to let 1924 take care of itself. However, as jobbers gambled this year in light underwear for next year and won, many of them may be willing, unless the unforeseen occur presently, to risk a part of the gain in a like venture.

Men's underwear, ribbed and bal briggan, was heavily bought and well bought for next Spring and Summer. The better situated mills sold freely at lower prices than subsequently were obtained on additional business. For goods bought somewhat recently jobbers paid a minimum of 25 cents more, on shirts and drawers, and up to 75 cents higher on union suits, and one mill in the Mohawk Valley took its lines off sale after having sold some lots at a dollar a dozen more. Lines were withdrawn as manufacturers found they had sold as far ahead as was justifiable on their yarn holdings, and later it was regarded a better policy to offer nothing for sale for a time, at any price, than name prices known to be offensive to buyers.

Although jobbers are receiving a fair sprinkling of Summer underwear orders from retailers they regard it too early to place duplicate orders, for, as one jobber says, "something may happen before we make deliveries to cause retailers to ask for deferred shipments, a request that often is a forerunner of a cancellation."

Ladies' underwear represents perhaps the more unsat-

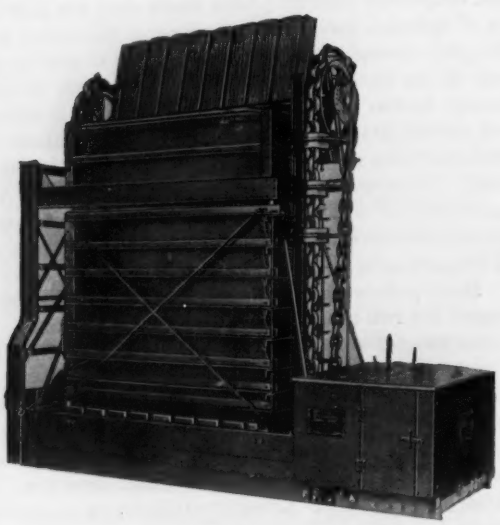
isfactory division of the knit goods trade. Buying for next Spring was much restricted and a number of mills making low end suits and vests have been out of orders for some time, with not a few Pennsylvania factories idle for long periods. It seems a foregone conclusion that some of those which get through this year on a bare existence will be engaged in some other line of endeavor next year. "There are too many mills of this class," it frequently is stated in the trade. "Production would be ahead of demand had there been no decline in the use of the cheaper garments, and with women giving preference to finer cotton garments and garments of silk," it is also said, "it must be obvious there will have to be a weeding out of mills."

It is currently rumored, but not confirmed, that a few sales of women's underwear for 1924-5 Winter have been made. This is more likely than that there will be any further buying of light weights for Spring.

A start has been made in the selling of sweaters for the next heavy weight season, but reports as to the volume of business are conflicting. Inasmuch as many dealers were caught short of stocks for the current season and unable to get desirable selections for wanted deliveries, it seems probable sweaters will be bought early, particularly as prices compare favorably with those for the present retail season.

Two Economy Balers.

The baling machine shown in the accompanying illustration is built to produce a standard size bale, 54 x 27 inches, for cotton waste and other materials, and is also built in any height chamber to meet any special require-

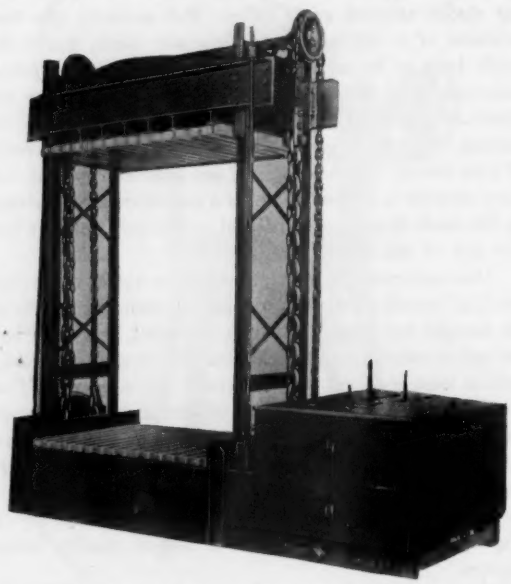


THE NO. 72 PRESS FOR WASTE, ETC.

ments. It is known as heavy duty type 72, and is manufactured by the Economy Baler Company, Ann Arbor, Michigan.

The machine is equipped with a two-speed mechanism, whereby the compressing platen travels at a high rate of speed of approximately two seconds per foot, and when the waste has been compressed to a certain density, it is shifted into slower speed of approximately ten seconds per foot travel, with tremendous added pressure, it is stated. The compression platen returns back up for the next stroke at the rate of two seconds per foot platen travel.

This heavy duty type press, the manufacturers state, delivers pressure equal to hydraulically operated presses



THE NO. 8 HEAVY DUTY CLOTH PRESS.

rated at 150 tons pressure, and operates at a comparatively much more rapid speed. Economy for maintenance and operation and ease of installation are features claimed for this new machine.

The same type of mechanism is also used on the heavy duty Economy cloth press which is also shown herewith.

Knit Goods Show April 7 to 11.

The Twentieth Annual Convention and Knitting Arts Exhibition of the National Association of Hosiery and Underwear Manufacturers will be held at the Commercial Museum, 34th and Spruce Streets, Philadelphia, April 7 to 11, inclusive, according to a statement issued by John Nash McCullaugh, national secretary and industrial manager, following a conference of members at the association's headquarters.

The convention of the association will be held Tuesday and Wednesday, April 8 and 9, for which a tentative program has been arranged. Four technical papers, dealing with problems of the industry, will be read by members of the association. Other features will be added from time to time as arrangements are completed.

At a conference recently, the following were appointed as the program committee: John Wyckoff Mettler, of the Interwoven Stocking Co., New Brunswick, N. J.; George F. Dickson, Minneapolis Knitting Works, Minneapolis, Minn., and Walter W. Moyer, of Walter W. Moyer, Ephrata, Pa.

The hosiery and underwear style show, held in conjunction with the exhibition for the first time at the last exhibition, will be held again next year on a larger and more pretentious scale. It is understood that plans for the style show are being considered now by the exhibition committee.

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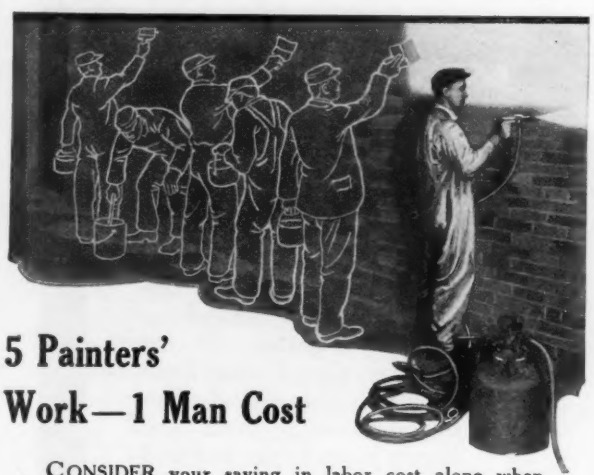

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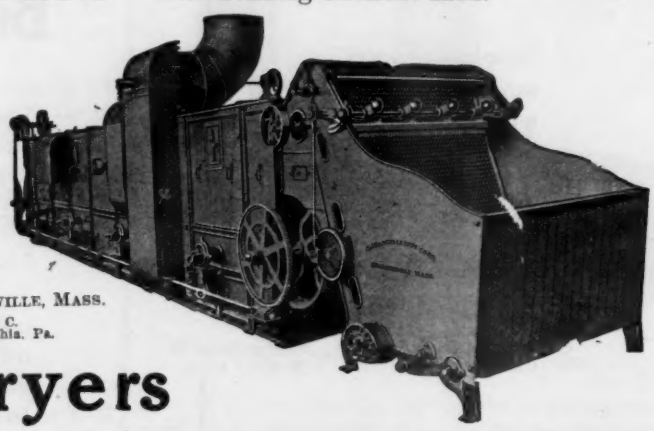

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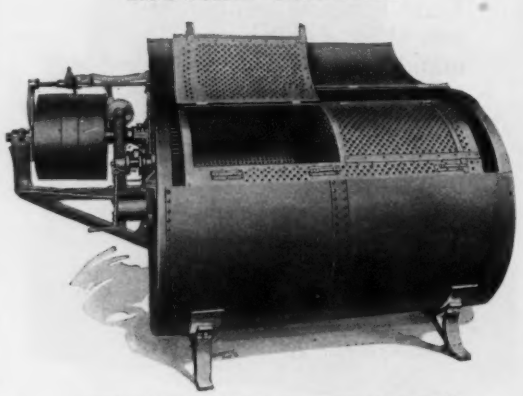

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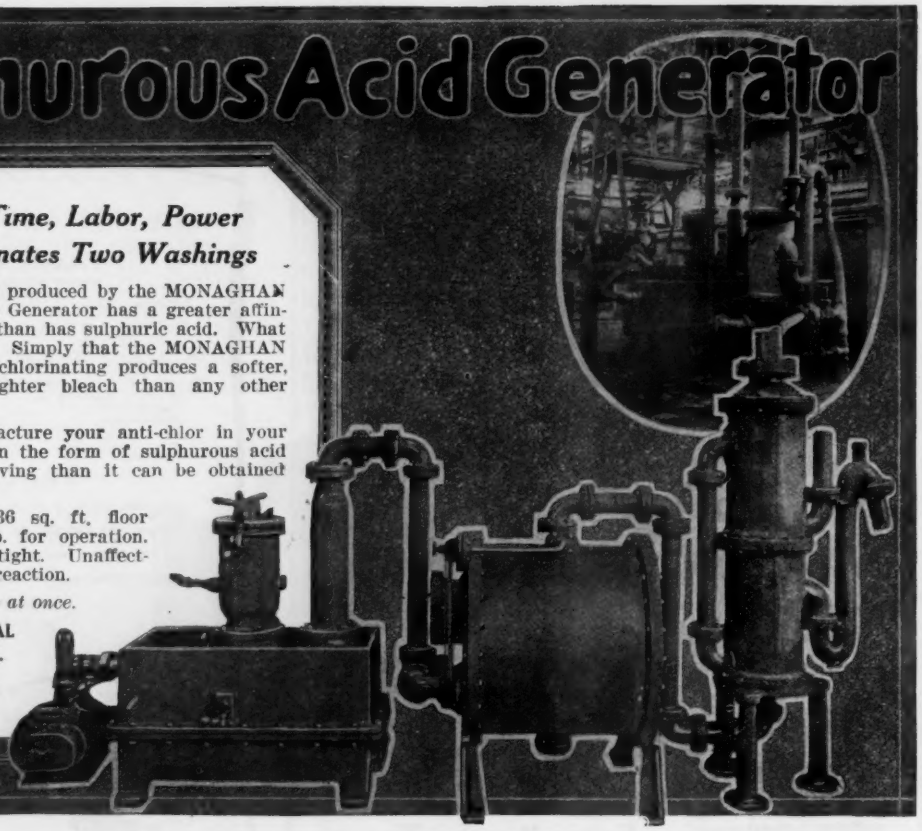

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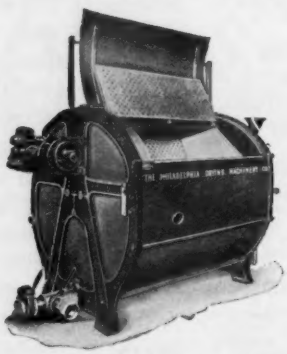

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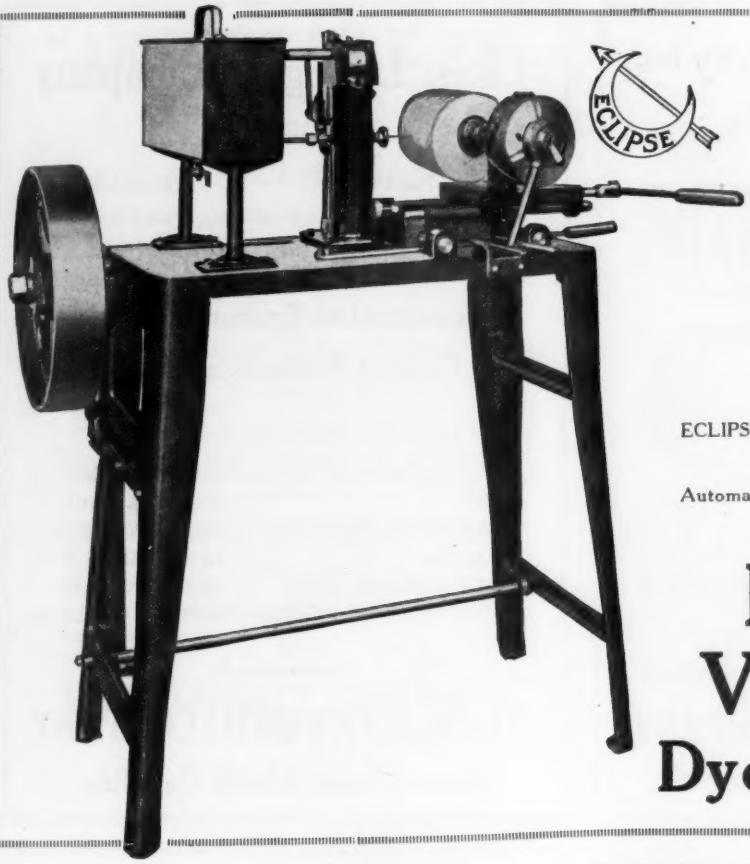

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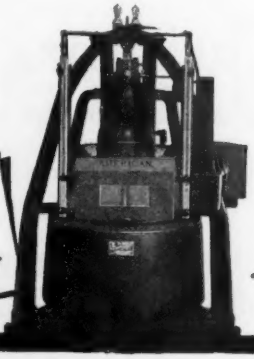

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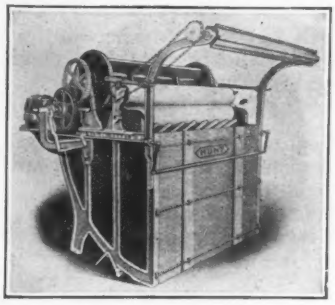
Your Wet Finishing Problem

Bleach
Dye
Wash



All Cotton Fabrics Woven or Knitted

MOTOR DRIVEN REEL MACHINE
(Ask for booklet 1119)

RODNEY HUNT MACHINE CO.
47 MILL ST., ORANGE, MASS.

District Representatives
Philadelphia, Pa.; Chicago, Ill.; Charlotte, N. C.
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Rohm & Haas Company Inc.

Manufacturers of

CHEMICALS

PHILADELPHIA, PA. BRISTOL, PA.

SODIUM HYDROSULPHITE—
Sulphoxylates and Allied Products.

LYKOPON—Sodium Hydrosulphite—
For reducing Indigo and vat dyes. Of highest quality and absolutely standard.

FORMOPON—For discharging.

FORMOPON EXTRA—For stripping.

PROTOLIN—For stripping.

INDOPON W—Indigo Discharge Assistant.

TARTAR EMETIC—Technical.

Represented by

The MAKENWORTH COMPANY
Greensboro, North Carolina

Chas. Lennig & Company

Incorporated

40 North Front Street Philadelphia, Pa.
Works: Bridesburg, Philadelphia, Pa.

Manufacturers of

Concentrated Sodium Sulphide
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Also manufacturers of the following chemicals:

ALUM	GLAUBER SALT
SULPHATE OF ALUMINA—	OIL OF VITRIOL
Iron Free	NITRIC ACID
PAPER MAKERS' ALUM	MURIATIC ACID
WATER FILTRATION ALUM	NITRATE OF LEAD

Represented by

The MAKENWORTH COMPANY
Greensboro, North Carolina

MONOPOLE OIL

Reg. Trade Mark No. 70991

A specialized textile oil, highly concentrated and double sulphonated which is used to better advantage wherever a Turkey Red or Soluble Oil has been employed because—

MONOPOLE OIL holds in solution all foreign matters and prevents the formation of lime soaps, iron spots, Calcium or Magnesium Salt, and thus—

Promotes level dyeing;
Assists in better penetration of dyestuff;
Increases the lustre;
Gives more body and a desirable handle.

For the best results in dyeing, bleaching, mercerizing and finishing of wool, cotton and silk, try this specialty.

Allow us to send samples.
The product will prove itself.

JACQUES WOLF & CO.
PASSAIC, N. J.

Christmas 1923

With the approach of Christmas and its spirit of peace and good fellowship it is with the utmost pleasure and sincerity that we join the many friends of the

WYANDOTTE PRODUCTS

in wishes for success, prosperity and hearty good will.

This year has been exceptional in its opportunities for "honest-to-goodness" service to humanity.

The realization of this fact not only brings the highest reward, but is also a definite incentive to greater effort and larger success.

To one and all we wish this realization and in the years so soon to come we hope that your prosperity will eclipse all previous experiences.

The J. B. Ford Co.
WYANDOTTE MICHIGAN

"ARTCO" SILK OIL

for

***use on* Artificial Silk**

Hosiery and Sweater Knitters find "ARTCO" Silk Oil to be the best product for this purpose.

Prevents waste and saves time

Softens the Thread and lays the Fibre, and produces a Fine Lustre.

Samples and full information on request.

Manufactured only
by

QUAKER CITY CHEMICAL COMPANY
Broad and Lehigh Ave.
Philadelphia

"BRETON" MINEROL "F"

For Cotton Raw Stock

"It reduces the waste in carding"

BORNE, SCRYMSER CO.
Established 1874
17 Battery Place, NEW YORK
BOSTON PHILADELPHIA
Works: Elizabethport, N. J.

Established 1815

ARNOLD, HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

Oldest in Years. Youngest in Spirit
Modern in Ideas. Progressive in Methods
"Service" Our Motto

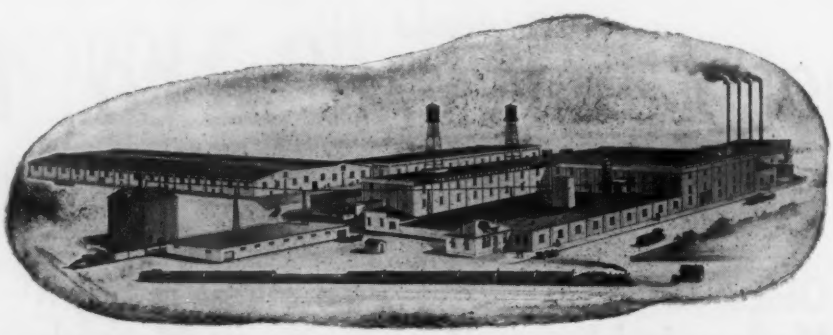
All kinds of
Warp Dressings, Finishing Materials, Soaps, Soluble Oils, Etc.

Please Submit Your Problems to Us

ESTABLISHED 1839
CHEMICALS
ZINC
GRASSELLI
EXPLOSIVES
DYESTUFFS

The seal which guarantees service
and satisfaction in your use of our

Quality Dyes



VICTOR MILL STARCH
The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio
Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.
If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

Utmost quality in textile products at lowest cost is assured through Staley service.

Staley experts go to the root of individual production requirements and compound the one best starch for each particular need.

Rigid adherence to original specifications in duplicate shipments is guaranteed by the most scientific and extensive manufacturing and laboratory facilities.

Service so constructive and capable provides invaluable insurance against production difficulties and fluctuations of output. Our consulting staff is at your call.

A. E. STALEY MFG. CO.

DECATUR, ILLINOIS

508 Andrews Law Bldg.
Spartanburg, S. C.
G. A. Dean, Manager

Ansley Hotel,
Atlanta, Ga.
J. W. Pope, Manager

25 Church St.
New York City
W. H. Randolph, Manager

88 Broad St.
Boston, Mass.
L. R. Dickinson, Manager

Staley's Starch

Douglas Crown Starch

evenly penetrates and gives a smooth, pliable finish

A thin boiling starch—absolutely uniform and equally as pure from foreign particles as the edible starch used in the home.

In addition to being manufactured by our special process, Douglas Crown Starch is finally bolted through silk in order to produce a finished starch absolutely uniform. The result is the most perfect working quality starch—a better starch cannot be made.

Years of experience in the manufacture of thin boiling starch and study of its use by the Textile Trade, have enabled us to produce the most satisfactory thin boiling starch offered.

We now offer Douglas Starch in the following grades—all made by our special process:

DOUGLAS CROWN STARCH
(a refined thin boiling starch)

DOUGLAS PEARL STARCH
DOUGLAS POWDERED STARCH
DOUGLAS WARP SIZING STARCH
DOUGLAS LION MILL STARCH

Our representative will promptly supply samples and full information. Write to

PENICK & FORD, Ltd., Inc.

Manufacturers of Corn Products

CEDAR RAPIDS, IOWA

or to any of the following offices:

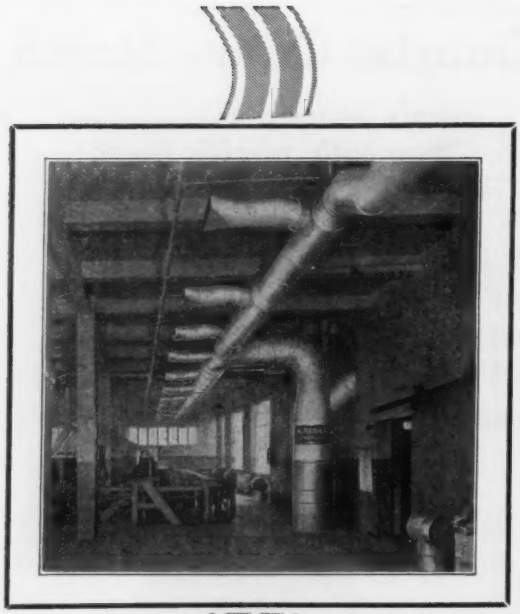
New Orleans, La. Montgomery, Ala. New York, N. Y.

Southern Representatives

G. L. Morrison, Greenville, S. C.
J. H. Almand, 1305 Healey Bldg., Atlanta, Ga.

N. E. Representative

Marble-Nye Company, Boston and Worcester, Mass.



Engineering

Placing your problems in the hands of this organization, gives you the benefit of all the experience of the foremost engineers in the country on air conditioning systems.

These specialists who are nationally known and recognized, have made air conditioning their life study.

They will be glad to refer you to an installation near you or give you the names of concerns in your own business who have successfully installed our air conditioning systems. You may then get in touch and understand why Sturtevant-Fleisher Systems are preferred.

Whatever your problems or conditions, these engineers who have installed hundreds of systems all over the country, will be glad to cooperate with you.

Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Hartford, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, Portland, Washington, Rochester, St. Louis, Salt Lake City, San Francisco, Seattle

Sturtevant
PUTS AIR TO WORK
HYDE PARK, BOSTON, MASS.

W. L. FLEISHER & CO., Inc.
31 Union Square West
New York, N. Y.

727

Uniform in Application

VICTROLYN

Penetrating, Lubricating, Dependable Assistant in Warp Sizing

KLORASENE

will remove Oil Stains.

If you are troubled, write us.

BOSSON & LANE

Manufacturing Chemists

ATLANTIC, . MASS.

SAVOGRAN

The Standard Cleaning Powder Has Cleaned Mills for Two Generations. Act Now.

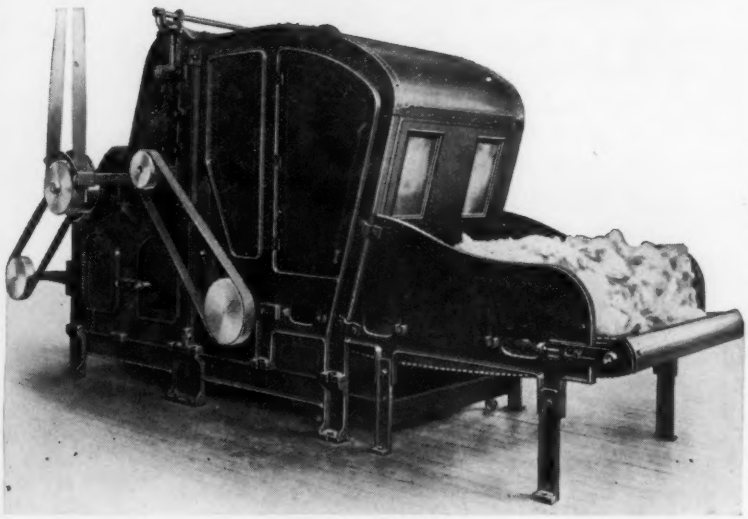
"ASK YOUR SUPPLY HOUSE"

India Alkali Works, Boston

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



Bale Breaker

Manufacturers of Picking Machines comprising

Bale Breakers,
Cotton Cleaners,
Feeders,
Vertical Openers,
Condensers,
Distributors,
Openers,
Breaker Lappers,
Finisher Lappers,
Willows,
Hard Waste Machines

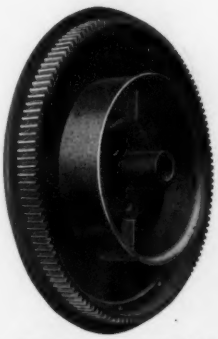
MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

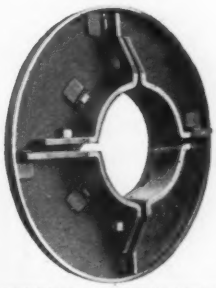
All Steel Loom and Section Beam Heads

Cannot Break
Do not Bend



"ALL STEEL" LOOM BEAM HEAD
"MALLEABLE" GEAR
Patent Pending

"ALL STEEL" SECTION BEAM HEAD
PATENTED



"ALL STEEL" ADJUSTABLE HEAD
SPLIT OR SOLID TYPE
PATENT PENDING

DUPLICATE YOUR CAST IRON HEAD IN STEEL — ELIMINATE ALL BREAKAGE
MAKE YOUR BEAM HEAD INVESTMENT PERMANENT

Mossberg Pressed Steel Corporation

Attleboro, Mass.

SOUTHERN OFFICE 201 AUGUSTA ST. GREENVILLE, S. C.

SHUTTLES THAT ARE PROVED

Williams' Shuttles have repeatedly proved their worth through years of usage among textile mills. Mill men have formed a high opinion of the dependable qualities of these shuttles. This confidence is inspired by a quality product—a shuttle that is designed to give the utmost in operation and durability.

After all, the attitude of the users of any article, is a true reflection of the worth of that article. Surely, the high regard in which Williams' Shuttles are held among mill men is sufficient indication of their reliability.

Our staff of shuttle experts are well qualified to help you with any shuttle problem you may have—ask them about it.

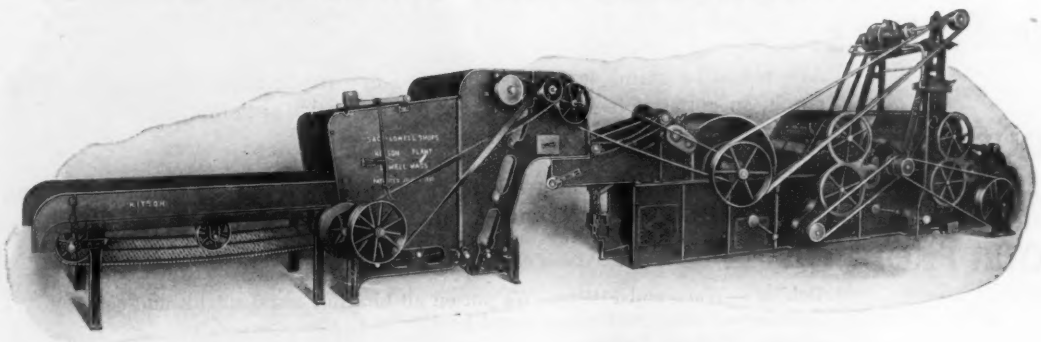
The J. H. Williams Co.

"The Shuttle People"

Millbury, Mass.

SACO-LOWELL

PICKING MACHINERY



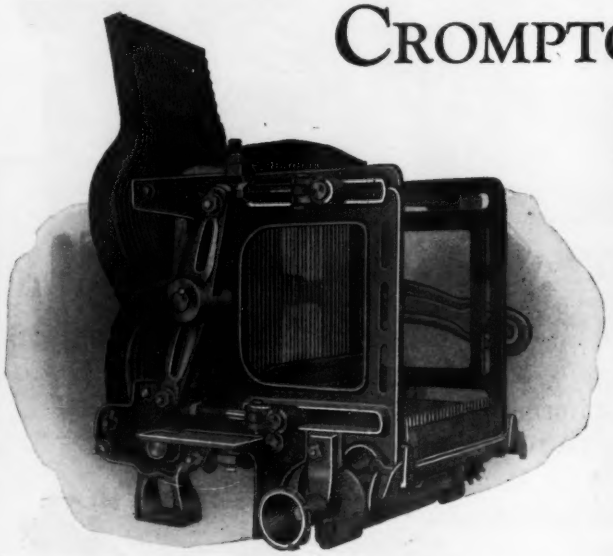
SACO-LOWELL SHOPS

ROGERS W. DAVIS
Southern Agent
Charlotte, N. C.

Branch Southern Office
Greenville, S. C.

Executive Offices:
77 Franklin St.
BOSTON, MASS.

SHOPS:
Biddeford, Me.
Lowell, Mass.
Newton Upper Falls, Mass.
Pawtucket ,R. I.
Charlotte, N. C.



CROMPTON & KNOWLES DOBBIES

NEW FEATURES OF SPECIAL INTEREST TO WEAVERS AND FIXERS

1. Built with slotted fingers and locking rod (patented), making it easy to remove, clean and replace the fingers.
2. We are now prepared to equip the dobby shown above with pressed steel jack backs and drop forged top and bottom hooks.
3. We call attention to the carefully machined swivels and studs used for operating the dobby knives.
4. This dobby can be applied readily to any make or type of loom.

CROMPTON & KNOWLES LOOM WORKS

WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA,PA. PATERSON, N. J.

ALEXANDER & GARSED, CHARLOTTE, N. C., Southern Representatives

WALTER L. PARKER CO.

LOWELL, MASS.

Manufacturers of Bobbins, Spools and Skewers

OUR SPOOLS:—

Are made to stand severe service and are made from thoroughly dried stock, so constructed that they are giving entire satisfaction.

OUR BOBBINS:—

Are made from the best grade of stock, and through the efficiency of our workmanship, are true running, and properly fitted on spindles.

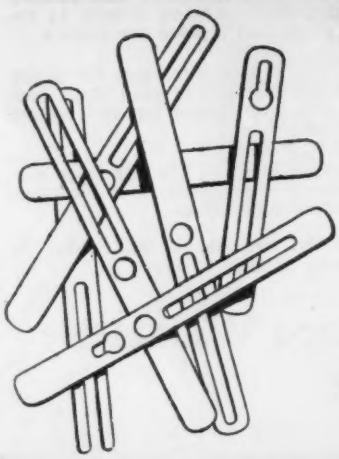
OUR PRODUCTS:—

Bobbins—Warp and Filling. We put on all kinds of metal shields and caps.
Speeders—Plain; steel rings; metal base.
Spools—Warper; Twister.
Our Metal Bound Spools are pronounced the best on the market.
Skewers—Cop, Warper and Roving, of all descriptions.
Twisters—Universal Winder Rolls and Bobbins, Comber Rolls, etc.

We Specialize in New Mill Equipment

CHARLOTTE SUPPLY CO., SOUTHERN AGENTS.

GREIST



Satin Finish Loom Drop Wires
are *Good Wires*

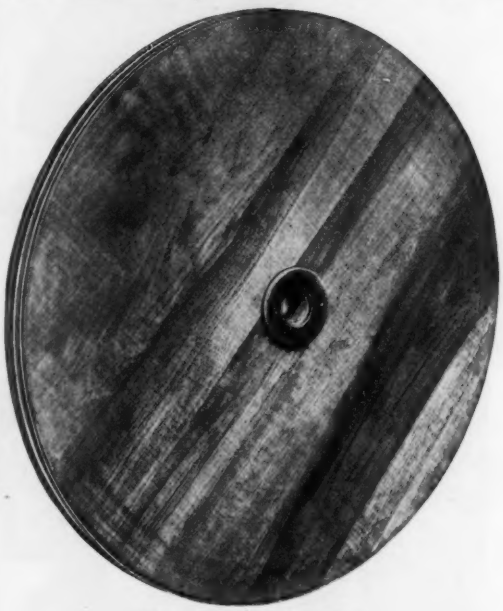
Uniformly made—free from burrs.
A reliable source of supply.

The
Greist Manufacturing
Company,
Dept. "C"
New Haven, Conn.

Southern Representative
SLAUGHTER-McCABE COMPANY, INC.
GREENVILLE, S. C.

ALLEN COMPANY WOODEN BEAM HEADS

Practically Unbreakable



WOODEN BEAM HEAD

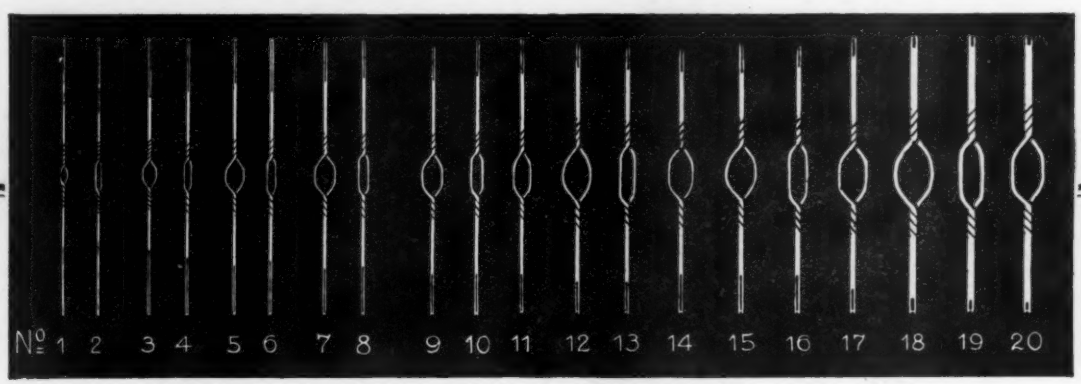
Allen Company Wooden Beam Heads are practically unbreakable, insuring longer life, they are lighter in weight which insures ease of handling and also a great saving in freight charges. Out of the thousands in use, not one complaint has been received of one broken causing loss of yarn or expense of rewinding.

Constructed of three pieces of selected scientifically kiln dried Beech lumber, securely glued together under heavy hydraulic pressure. Accurately turned on centers. Protected on outside diameter from splintering and general wear by cold shaped upset steel tires. Finished by a water-proofing process and painted any desired color.

ALLEN COMPANY
NEW BEDFORD, MASS.

Also Manufacturers of

Section Beams and Combination Section Beams, Top Beams, Beam Trucks, Box Trucks, Braider Reels, Lug Sticks, Mechanics Benches, Overseers Desks, Cabinets and other wooden specialties.



Ordinary Warp Eyes

SWISS TWIN WIRE HEDDLES

Paper Mache Spools and Bobbins
Drop Wires—Pick Forks

J. J. REUTLINGER

160 Fifth Ave. **New York City**

Southern Representative; **RALPH M. LANE,** P. O. Box 1375, Charlotte, N. C.

For those of you who did not attend the Textile Show

It was too bad that you missed the many new ideas and improvements that have been developed since the last show.

At "Shuttle Headquarters" for instance, there was an unusually interesting display of Shambow "Custom Built" Shuttles.

They created much favorable comment.

But, because you did not see them at the show is no reason why you shouldn't have an opportunity to see them.

We are prepared to send you a man who will show you shuttles and weaving devices of great interest to you. He is a Shuttle Engineer and should you require it, he is fully capable of redesigning your present shuttle or designing an entirely new model for you.

This expert service won't cost you a cent and may save you much money. Just sign and mail the coupon or write us.

Shambow Shuttle Company
Woonsocket, R. I.

JOHN C. SHAMBOW, Pres. & Treas.
H. H. ULLMAN, V. Pres. & Gen. Mgr.

Philadelphia 42 421 Bulletin Bldg. | Paterson, N. J. 245 Straight St. | Greenville, S. C. Southern Factory

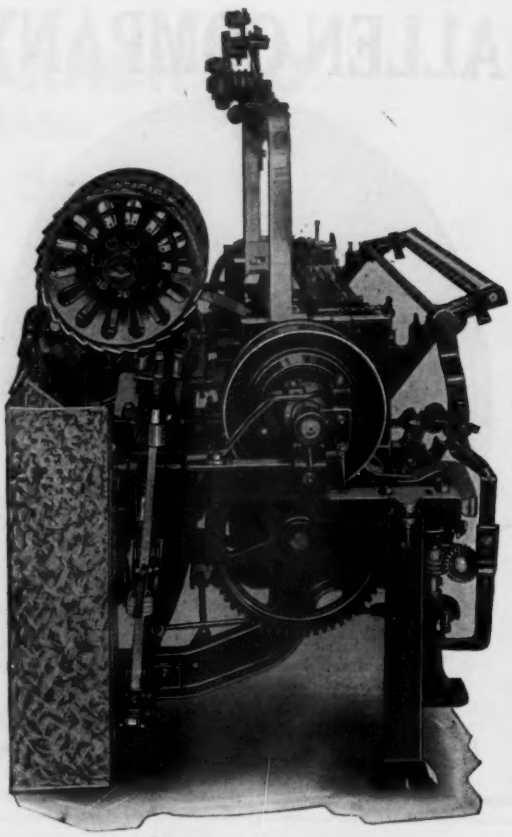
COUPON

SHAMBOW SHUTTLE CO., Woonsocket, R. I.

We will be interested to learn more about the new shuttles, tensions, threaders and other devices without obligating ourselves in any way.

Company .....
By .....
Address .....
.....

SHAMBOW MAKES
shuttle bills smaller
interruptions fewer
production greater
products better



The Latest
NORDRAY
Automatic Loom

Multiple-harness, Feeler type

built by

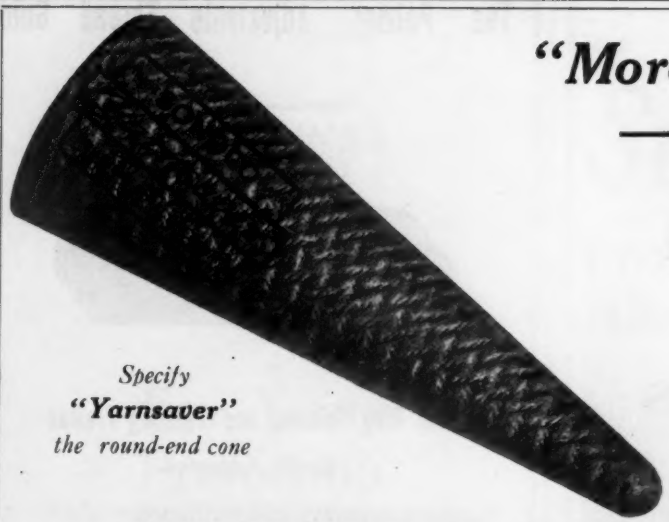
HOPEDALE MANUFACTURING CO.

at MILFORD, MASS.

SOUTHERN OFFICE at GREENVILLE, S. C.

This loom was shown at the Late Greenville Exposition and excited great interest.

It is Still the Simplest.



Specify
"Yarnsaver"
the round-end cone

"More Yarn in 1924, —and Better"

A big assignment nowadays ;

It means a careful check-up in every department;

Equipment a little better used;

Here and there, a little better equipment used;

And in the Winding Room Sonoco cones and tubes because they are *invariably* accurate.

"SONOCO" CONES AND TUBES

Sonoco Products Co., Manufacturers, Hartsville, S. C.
Successors to Southern Novelty Co.

What Part of the Spool is First to Wear Out?

Your superintendent will confirm our statement that 99% of all Warper, Twister or Spooler Spools become useless on account of the heads breaking, wearing rough or loosening. This is true of all types of spools heretofore on the market.

With the Lestershire Type Vulcanized Fibre Head Spools just the opposite is true. The Heads will outwear the barrels because Hard Vulcanized Fibre (the same material from which end thrust bearings and automobile gears are made) will never break, wear rough nor splinter.

Of course the first cost is higher but, figuring your charges per thousand spools per year, they are by far the most economical spools on the market today.

In addition Lestershire Fibre Head Spools will in the ordinary mill give you an increased unloading production of nearly 50%. Put a row on your creel and compare the time necessary to unload with any other type Spool.

On the smooth Rock Maple barrel, cleanly jointed to the Fibre Heads which cannot get rough and cannot be dented, there is no place for the yarn to catch.

Spindle wear is also eliminated by bushings of hard well seasoned Dogwood.

Increased traverse can be had which will give you greater yardage on your spools. This means a saving of many dollars in the course of a year, not only direct but in labor required to change the spools.

At your request we will gladly send samples for purposes of test and comparison.

LESTERSHIRE SPOOL & MFG. CO.

Manufacturers Mill Spools, and Bobbins, of Every Description

General Offices and Factory
JOHNSON CITY, N. Y.

Southern Branch Office:
32 So. Church St.,
CHARLOTTE, N. C.

TRADE MARK

LOWELL MILL CRAYONS

the original crayons for textile mill use, and for years the standard with America's leading mills.

Lowell Crayons are made in white and 15 colors, as follows:

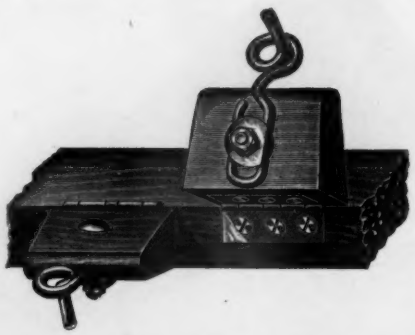
1 Yellow	2 Red	3 Pink	4 Blue	5 Purple	6 Brown
7 Black	8 Green	9 Orange	10 Dark Green		11 Light Red
12 Rose Pink	13 Light Green	14 Light Blue	15 Orange No. 2		Wh.

Order by number, please.

LOWELL CRAYON CO.

Lowell, Mass.

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

REEDS

For Cotton, Woolen, Worsted, Silk, Tire Fabrics, Webbing, and Wire Cloth.

We make a specialty of all Metal reeds, for Tire Fabrics, and Leno work.

HAYES LOOM REED & HARNESS CO.

182 Farm St. Woonsocket, R. I.

AMERICAN SUPPLY COMPANY

PROVIDENCE, R. I.

Manufacturers of

LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
ETC.

We make a specialty of Harness for Warp Drawing Machines

PERKINS PRACTICAL BRUSH
ATLANTA BRUSH COMPANY

For Your Protection

"Perkins Practical" Brushes are widely imitated.

That is sincere flattery of course and we consider it such but it's only fair that if you think you are buying our Brushes you should get them.

That is why the trade-mark at the head of this advertisement or the name Atlanta Brush Company is put on our Brushes FOR YOUR PROTECTION.

Only "Perkins Practical" Brushes carry our guarantee of quality and service. It is the guarantee that standardized Brush Buying.

ATLANTA BRUSH CO.
ATLANTA, GA.

ATLANTA BRUSH COMPANY
A Brush for every Textile Need

Electric Scrubbing!

Promotes Better Work through Cleaner Floors

BATES MFG. CO., Lewiston, Maine.
Manufacturers of Ginghams, Bedspreads and Damasks.

Such a manufacturer as the Bates Mfg. Co., noted for the high quality of its output, finds the service of FINNELL Scrubbers extremely profitable.

There is not half the danger of spoilage through soiling in such a mill. The FINNELL **System of Electric Scrubbing** keeps floors as near to being spotlessly clean as is humanly possible. It maintains this cleanliness for much less than it costs to keep floors even partly cleaned by old fashioned hand and knee scrubbing.

More than three hundred textile mills have adopted the FINNELL System. It has proved its worth conclusively not only in time and labor saved and greater cleanliness, but also in its beneficial influence upon the health and happiness of workers.

If you wish to see exactly how the FINNELL System operates, write us, asking our representative to bring his projector to your office and show you our motion picture films.

Free Booklet

"Electrical Scrubbing," a small booklet, will be sent to any executive on request together with our latest broadside containing large pictures and full description of FINNELL equipment in various sizes. Address

AMERICAN SCRUBBING EQUIPMENT SALES CO.
General Offices and Factories
512 COLLIER ST., HANNIBAL, MO.
Power Scrubbing Headquarters for Seventeen Years

FINNELL SYSTEM
OF ELECTRIC SCRUBBING

"Clean Floors Reflect Clean Business"

The Cash Value of AIR

Write for bulletin describing highly developed American Blower Equipment and its efficiency and economy when applied to any of the following lines:

Heating and Ventilating
Air Conditioning
Mechanical Draft
Fans and Blowers

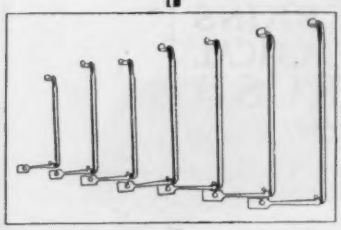
The American Blower Company offers the co-operation of a competent engineering department for the solution of any Industrial problem involving the handling of air. Correspondence on any subject is invited.

AMERICAN BLOWER COMPANY, DETROIT
CANADIAN SIROCCO CO., LTD., WINDSOR, ONT.
BRANCH OFFICES IN ALL PRINCIPAL CITIES (333)

American Blower

EXHAUSTERS · VENTILATING FANS · AIR WASHERS · BLOWERS · ENGINES
FOR HEATING, VENTILATING, DRYING, AIR CONDITIONING, MECHANICAL DRAFT

Three Reasons for the High Quality of Our Flyer Pressers



—these are—Proper Design. Great Strength and Lasting Smoothness. In the perfecting of each of these features we have spared neither trouble nor expense. Our machine shop is the finest and best in the South. Our workmen are experts and the material used is the Best Norway Iron. For Quality and Service specify S. S. & F. Co.'s Flyer Pressers.

We specialize in the aligning and leveling of shafting, re-arranging, overhauling, erecting and moving Spinning and Card Room Machinery.

Southern Spindle & Flyer Co., Inc.
CHARLOTTE, N. C.
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Cost
may be a primary consideration

The Liberty Knotter
not only fills the requirements of low first cost but is most simple in construction and economical in upkeep and operation. Give it a trial.

Guaranteed for one year
Write for information

A. B. CARTER, Sales Agent,
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Mill Devices Co. Durham, N. C.

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SOUTHERN SPINNERS
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"AMTEX"
SPINNING, TWISTING AND SPOOLER TAPES
Than ever before

This increasing demand indicates the superiority of AMTEX Tapes over all others.

We are pleased to build special Tapes for your particular needs.

Send us your specifications and we will guarantee satisfaction.

Manufactured by

AMERICAN TEXTILE BANDING CO., INC.
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Sold in the South by
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This cut shows one of our Combination Yarn and Fabric Testers equipped with Autographic Recorder. This attachment automatically draws a line on ruled paper giving both the strength and stretch readings. By its use, a clearer understanding of these qualities of the material is obtained as the whole test is given in one line.

May we send you the Catalogue?

HENRY L. SCOTT & CO.

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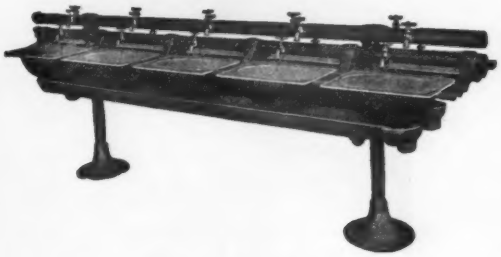
Have Cut Production Costs in Every Mill Where They Have Been Installed. Let Us Send You Proof



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They're Built for Service

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When the cover wears out the basket is not rendered useless. All you have to do is slip on a new cover, and you have a basket as good as new. Think of the great saving. You can save at least 50% on your mill baskets by using SMITH'S 100% Baskets.

Best made for doffing purposes, distributor baskets, storage baskets, etc.

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For Weighing and Checking

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Toledo Scale Company, Toledo, Ohio

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Largest Automatic Scale Manufacturers in the World

106 Sales Rooms and Service Stations in the United States and Canada. Others in thirty-four foreign countries

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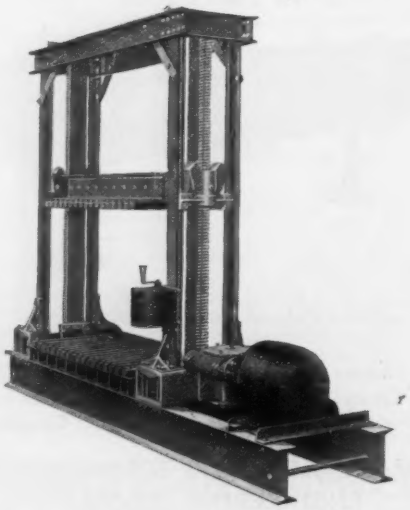

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Speed, Strength, Simplicity

Built any size and pressure.

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To build a press so good that the simple truth about it will be adequate recommendation and to price it so fairly that its value can never be questioned.

Watch for the Yarn Press.

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"The House of Better Service and Prices"

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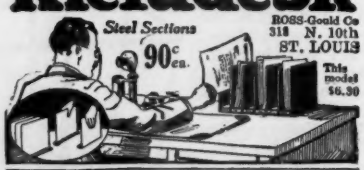

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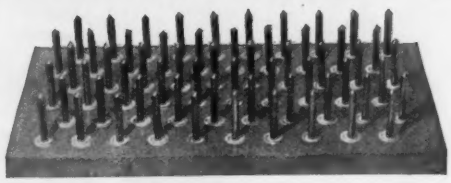
REG. U. S. PAT. OFFICE



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Are You Responsible

for good weaving in your mill? If so, you should know Kore-Lokt Pin Boards and the story of their usefulness in modern loom equipment.

Expert Opinion from men in charge of the weave rooms in prominent mills is available to superintendents and overseers upon request.

Send for this information so you may know the merits of Washburn Kore-Lokt Pin Boards as an improvement over old style Filling Boxes. Learn how the other fellow checks up results from the "Build of Bobbins."

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FOR

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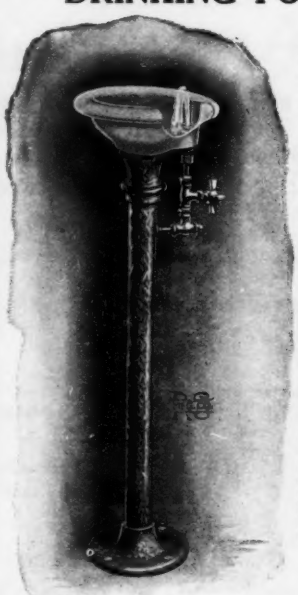
EQUIP YOUR PLANT WITH

Rundle-Spence "Vertico-Slant" DRINKING FOUNTAINS



Rundle - Spence "Vertico-Slant" Drinking Fountains are the direct result of years of experimentation, with the view to producing a drinking fountain that would not merely serve as a convenient method of supplying drinking water, but a fountain absoultely sanitary in design, durable in construction,—plus economical in cost.

The construction of the RUNDLE - SPENCE "Vertico-Slant" Drinking Fountains absolutely eliminates all possibility of contamination. They are positively germ proof and durable in construction.

The Rundle-Spence "Vertico-Slant" Drinking Fountain has no hood on which the corner of the mouth can rest — LIPS CANNOT TOUCH THE NOZZLE—no filth collecting crevices that are impossible to clean—but is neat in appearance and absolutely sanitary in every respect. Made in a variety of designs to meet every requirement.

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Complete Stocks in Columbia for Prompt Shipment.

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STANDS ROUGH HANDLING

No matter how short a distance or how far you ship your goods, the containers are subjected to a certain amount of rough handling.

Goods packed in HIGHTOWER Wooden Packing Cases stand the roughest handling without the slightest injury to their contents. In shipping your goods in these superior cases you get maximum protection at minimum cost.

Just Exactly Right

HIGHTOWER Cases are light in weight, thus reducing freight expense—and the interlocking reinforcement feature makes this box unparalleled for strength. They will carry heavier materials and are harder to pilfer and break open in transit.

Just the case for the textile industry. May we have your inquiry for full details and prices?

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Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

Enameled Roll flushing rim bowls.

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Malleable seat castings will not break.

Tested under hydraulic pressure before leaving factory.

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The Village that Pays!

Dark streets and poorly lighted cottages are handicaps in keeping operatives and increasing contentedness and productiveness—a wet blanket on civic pride and an invitation to vice and crime.

Electrically lighted cottages and efficient street lighting for your village will pay you and pay you well, in more ways than one. Make your village a "live-town" with lighted highways and hospitable, cheery homes.

An H. & G. installation won't cost you much and H. & G. Service will help you conomize on the investment. Let's talk it over.

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Permanently Linked With the Interests of Southern Mills

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Our business is to act as engineers, architects, financiers, contractors and supply municipal improvements for cities, towns, small municipalities and mill villages. Our aim is to give the best possible service at the lowest possible cost and add to the health, wealth and happiness of the mill and its employees.

Our record throughout the Southern States is an open book. We have designed or built over 700 water, light and sewer systems for Southern communities and over 5000 miles of hard surface street paving and highways amounting to over Two Hundred Millions of Dollars.

Our operations are based on scientific experiences. Hazard, risk and uncertainty are eliminated. McCrary experienced service can be secured at a fraction of the cost you would have to pay through any other source.

Call on us or have your architects call us in conference when village improvements are under consideration.

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Waterworks, Sewers, Pavements, General Village Improvements.

MOST EFFICIENT
EASIEST TO STRIP
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This Describes

REALFLEX

No other Flexible Armored Cable approaches REALFLEX. More of it is used than any other armored cable. It is especially good for wiring old buildings or light power installations.

If you have used it, you are still using it. If not, you should try it.

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is the name given us by our many friends throughout the South.
We apply roofing in the most modern and satisfactory manner known. We've been doing it for over 42 years.
No matter whether you want your roof patched or whether you desire your entire mill roofed, we can do it in a manner that will pleasantly surprise you. Economical? YES!

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Established 42 Years
ATLANTA, GA.

This Message May Mean Actual Money in Your Pocket

THAT'S what you're interested in—greater profits.

Among the many items that constitute "overhead" the paint for your mill plays an important part. You can reduce your painting expense by applying ZEMCO-LITE "The Cement Paint," thus reducing your overhead, and increasing your dividends.

Not only is ZEMCO-LITE economical in initial cost, but its unusual lasting qualities and light refracting properties are unparalleled.

In short ZEMCO-LITE sticks and stays. Is always white. Does not peel, chip, crack or blister. Unaffected by weather or mill conditions.

ZEMCO-LITE can also be used for covering standpipes as it is a non-conductor of heat and preserves the pipe.

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AMERICAN CEMENT PAINT CO.
CHATTANOOGA, TENN.

Zemco-lite
TRADE MARK

"The Cement Paint"

"Cement for Permanence--Why Not Zemcolite?"

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is a species of lumber that might well be said to be "grown to order" for

TEXTILE MILL FLOORS, PLATFORMS

and other places and uses where "wear and tear" must be expected and provided for. *Leave it to TUPELO!*

This Softwood Hardwood has an "involved" grain which keeps it from slivering or splintering. A TUPELO floor wears smooth because it wears little—always looks well, because TUPELO has a fine, white color and a satiny sheen.

We'll gladly tell you the whole, interesting story of TUPELO if you'll write and say "we're listening."? When? TODAY?

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Wood Preservatives, Stains, All colors Metallic and Composition Paints

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Defeats the Costly Ravages of Weather and Wear

Makes all surfaces—wood, metal or composition — moisture proof; rust proof; rot proof.

Adds years of serviceable life to every part of the mill. Best of insurance against replacement or repair costs.

Used and recommended by Industrial Plants and Cotton Mills, everywhere.

Distributors of FLINTKOTE Roofing.

Our Application Department will be glad to give you estimates on applying new roofs.

Our Service Department at your call—any time—anywhere.

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Every 20 minutes the "DIXIE" Ventilator effects the elimination of all foul air in the room and a complete inflow of pure air.

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can be laced with one box of

BRISTOL'S

Patent Steel Belt Lacing

A HAMMER is the only tool necessary—you already have that.

Saves time—saves money—always ready.

Have you seen Bulletin J-713?

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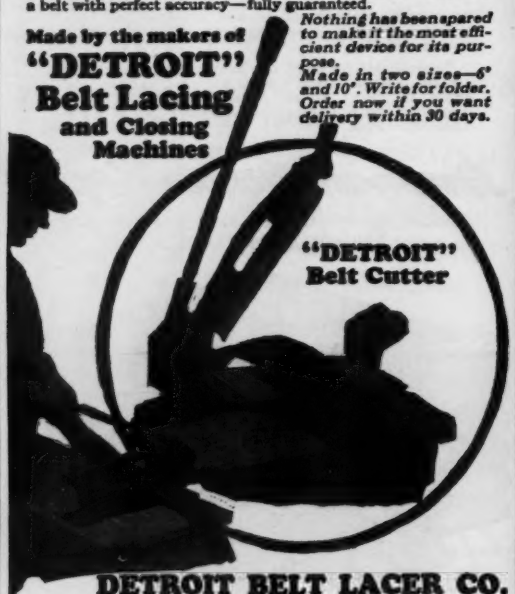
When you know the features of the New Detroit Belt Cutter you will agree that no belt user can afford to be without it.

The knife arm lifts to make it easy to apply the belt. It squares a belt with perfect accuracy—fully guaranteed.

Made by the makers of "DETROIT" Belt Lacing and Closing Machines

Nothing has been spared to make it the most efficient device for its purpose. Made in two sizes—6" and 10". Write for folder. Order now if you want delivery within 30 days.



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Detroit, Michigan, U. S. A.

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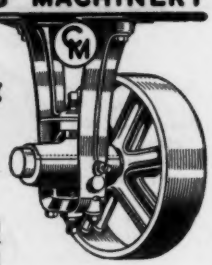

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Complete plant equipment.
Engineers; founders; machinists.
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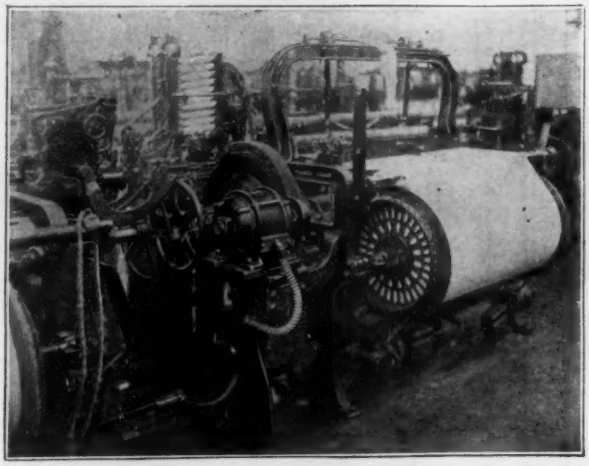
Sixty Years Experience as Engineers · Founders · Machinists

Loom Motors



Allis-Chalmers Loom Motors for individual drive are designed especially for this class of service.

They are totally enclosed, thereby eliminating any trouble for dirt or lint getting into the motor; equipped with waste packed bearings, minimizing the required attention; have tapered shaft for the ready mounting and dismounting of pinions and are arranged for conduit connections.

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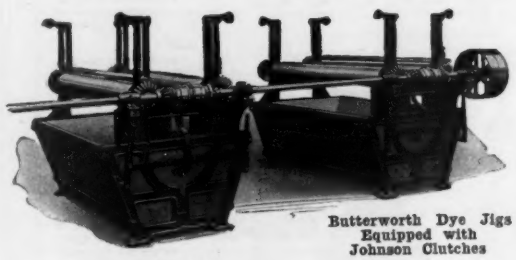
THE JOHNSON FRICTION CLUTCH

That Drive on Your Dye Jigs--- Has It Ever Caused Trouble ?



Butterworth Dye Jigs Equipped with Johnson Clutches

Friction Control Means Better Machinery

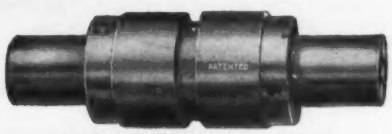
There are many drives in the dye house which can be handled most efficiently by a good friction clutch. We design clutches to meet any requirements and are always glad to consult on your problems.

Write for our Catalog G

Are you using a jaw clutch that jerks and grabs—or a friction clutch that slips and falls down on the job? It is a common difficulty and a troublesome one.

H. W. Butterworth & Sons Company, builders of one of the oldest and best lines of dyeing and finishing machinery, have found a decided advantage in the Johnson Clutch for this work. Dyeing establishments all over the country are now using Johnson Clutches on Butterworth machines in the arrangement shown here, and know from actual experience that they are capable of the finest service.

The Johnson Clutch has been applied with equally good results on other machines of this type, and on textile machinery generally—in the dyehouse and elsewhere. By its compact, enclosed design and its smooth and easy operation it is admirably suited to the requirements of the textile shop.



Johnson Double Clutch as used on Butterworth Machines

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

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Every Clipper Belt Lacing Machine is sold with the understanding that if after 30 day's trial it does not do all that is claimed for it and is not entirely satisfactory, it may be returned without expense; and with the further understanding that it will be kept in repair free of charge by the manufacturers as long as genuine Clipper Belt Hooks are used exclusively with it.

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Have always "made good," that's why the most eminent engineers of the country recommend the Clipper Method of Belt Lacing.

Over 200,000 in daily use ALL OVER THE WORLD.

The Clipper should be in YOUR plant.

To prove the many superiorities of CLIPPER BELT LACING, any one of our authorized Mill Supply Dealers will gladly deliver a Clipper to you for 30 days' Free Trial.

Clipper Belt Lacer

Clipper Belt Lacer Company

Grand Rapids, Michigan

CLIPPER BELT LACER CO., Grand Rapids, Mich.

☐ Please send Clipper Belt Lacer on 30 days trial.

☐ Please have salesman call and demonstrate Clipper Belt Lacer.

☐ Please send full information regarding Clipper Belt Lacer.

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Uneven Laps

Cause uneven work. Slipping evener cone belts cause uneven laps. Friction in the apron and evener rolls makes the cone belt slip.

Ball bearings remove this friction and allow the cone belt to give the proper feed of cotton to the beater.

The installation is not expensive and is used on hundreds of lappers.

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Ball WorkS Bearings

Greenwood, S. C.

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Bronze Gate Valves

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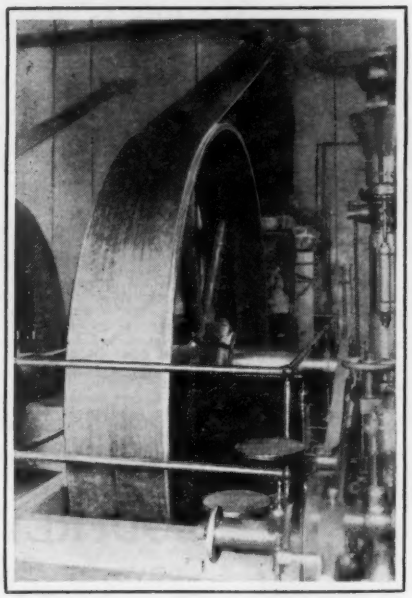
Nothing takes the place of **Leather**



They have paid for themselves several times

THE right belt in the right place. The right quality of leather, the right tanning methods, the right weight, flexibility and thickness to transmit the right amount of power—this is what the Graton and Knight Standardized Series of Belts means. And this is belting economy.

Out in the Middle West the manager of a large mill after making several severe tests with different sorts of belts decided to rebelt his entire mill with leather. Among the leather belts that were used for making the tests were some members of the Graton and Knight Standardized Series.

The Graton and Knight Belts stood the tests so much better than any of their competitors that they were chosen for the job.

And this is what the manager of the mill* wrote us some years later:

> "Some of your belts have been running for several years and as they are in as good condition as when they were installed we are unable to give you any opinion as to the length of service we will get out of them, but at this time we are convinced that they have paid for themselves several times."

Send for the book "The Standardization of Belting," and at the same time let us know the type of power transmission you are most interested in. This book tells how, through constant study and analyzation of transmission problems, we have developed a series of belts to meet every condition.

We will gladly have a Graton and Knight engineer call upon you and place at your disposal one of the widest belting experiences in the world.

*Name upon request.

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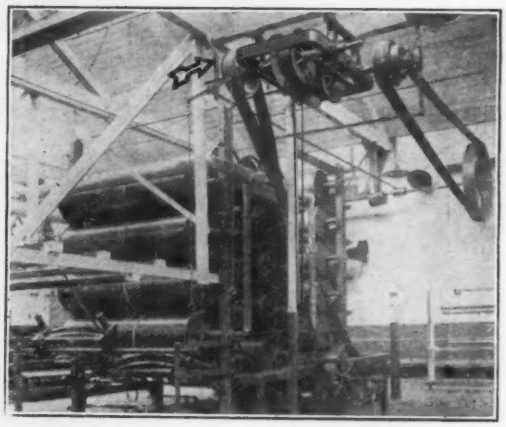

No .5-F REEVES Transmission on Drying Machine. Courtesy of the Bradford Dyeing Association, Bradford, R. I.

"The Reeves" VARIABLE SPEED TRANSMISSION

One of the most important factors in the successful operation of drying cans, tentering frames, washers, etc., is the ability to control the speed of these machines. The speed determines not only rate of production but the degree of perfection of the products being manufactured.

The above cut illustrates a No. 5-F Reeves Transmission regulating the speed of a Dryer, in the plant of Bradford Dyeing Association who have used several REEVES Transmissions for over 15 years.

"The Reeves" complete ball Bearing Transmission represents the best and most dependable sion regulating, speed controlling mechanism manufactured today. Every bearing is a specially designed, self aligning, dust proof and oil-tight ball bearing which requires oiling only at long intervals.

Over 95% of the world's industrial plant requirements for mechanical variable speed control are now filled by "The Reeves" Variable Speed Transmission.

Write for catalog C-44.

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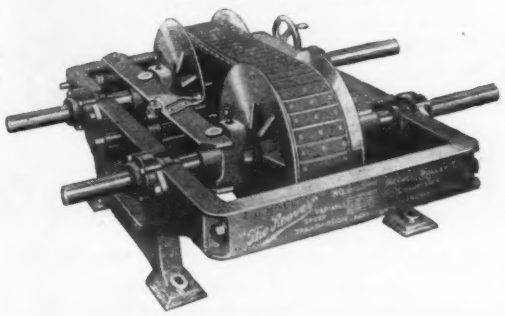

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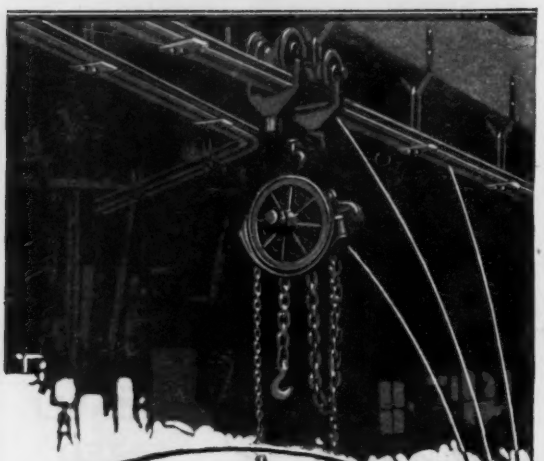

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—the only hand hoists built with a gyrating yoke, a patented construction feature which keeps two thirds of all gear teeth always in contact to lift the load. Equipped with roller bearings. A *safe*, powerful, high-speed hoist, that gives more lift per pound pull,—an 80 lb. pull will lift a ton.

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—a simplified, inexpensive track system. Double rail for greater safety. Hangers are adjustable to align track and can be wide spaced for economy. Track can be bent cold to any radius curve, and easily installed by any mechanic.

The experience of our engineering department is at your service whenever needed. Distributors everywhere.
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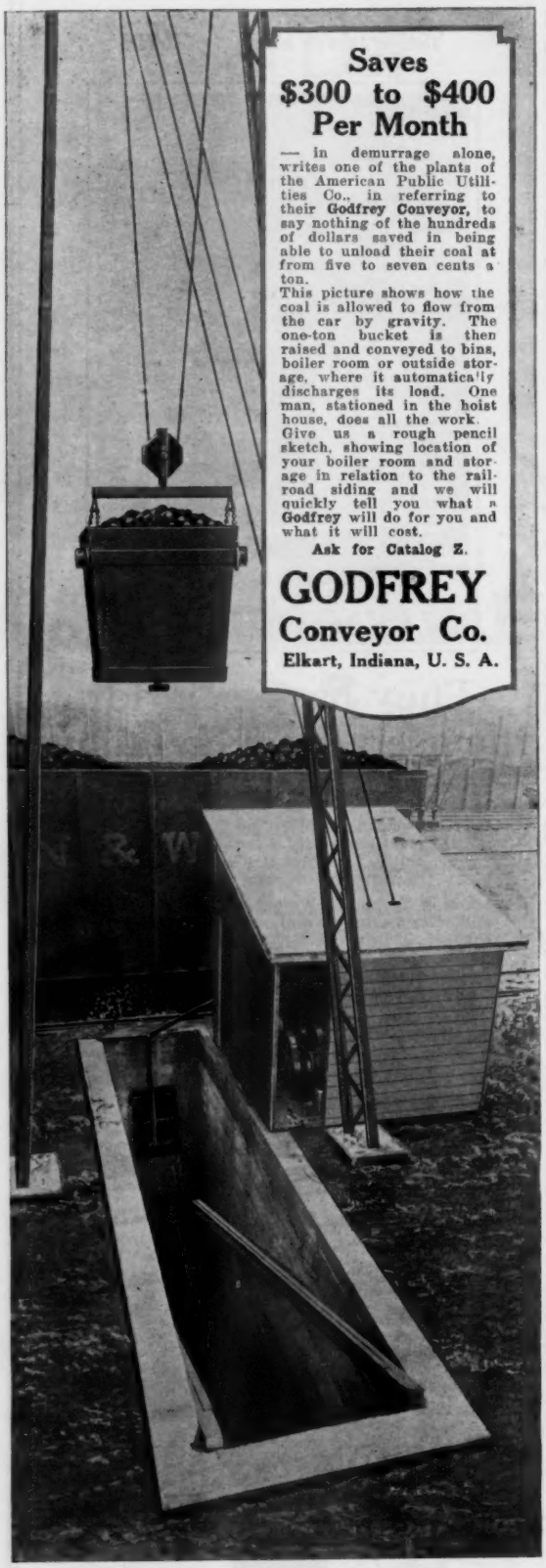
Branches: **New York, Chicago, Pittsburgh**



Saves $300 to $400 Per Month

— in demurrage alone, writes one of the plants of the American Public Utilities Co., in referring to their **Godfrey Conveyor,** to say nothing of the hundreds of dollars saved in being able to unload their coal at from five to seven cents a ton.

This picture shows how the coal is allowed to flow from the car by gravity. The one-ton bucket is then raised and conveyed to bins, boiler room or outside storage, where it automatically discharges its load. One man, stationed in the hoist house, does all the work.

Give us a rough pencil sketch, showing location of your boiler room and storage in relation to the railroad siding and we will quickly tell you what a **Godfrey** will do for you and what it will cost.

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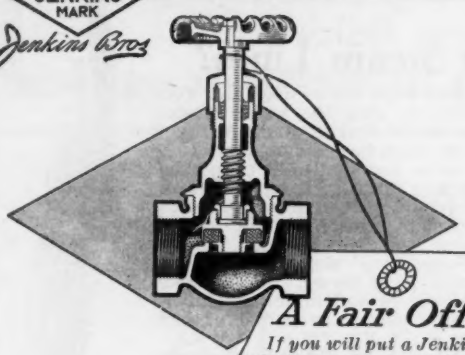

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If you will put a Jenkins Valve on the worst place you can find, where you cannot keep other valves tight, and if it is not perfectly tight, or does not hold steam, oils, acids, water, or other fluids longer than any other valves, you may return it and your money will be refunded.

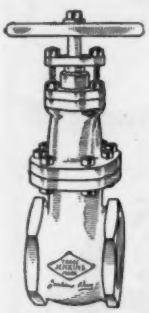

Fig. 325. Standard Iron Body Gate Valve.

All Jenkins Valves are delivered to you with this fair offer, as printed in our general catalog. In actual service, Jenkins Valves are living up to their sound construction and this fair offer.

Where they are installed, low cost of valve maintenance and unfailing valve service are obtained.

Fig. 108. Standard Bronze Angle Valve.

Standardize on Jenkins Valves to provide this efficiency and economy in valves.

Valves in bronze, iron, and steel for all requirements. At supply houses everywhere.

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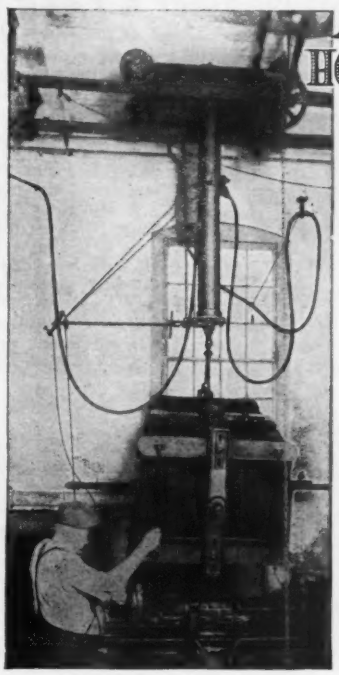
AIR HOISTS



Lift it with air"

Used in The Textile Industry

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

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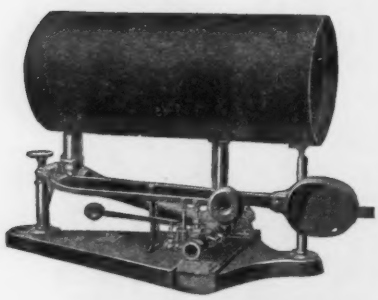
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES

ST. LOUIS

Established 1854

Would You Neglect a Leak in Your Steam Lines?



If a jet of steam were shooting from some pipe joint you would be making frantic efforts to stop the awful waste. Why, then, do you ignore the waste that is going on constantly inside your steam lines or steam heated machinery?

We mean condensation. It forms constantly—it cannot be stopped. Unless removed by proper drainage it retards steam circulation, and cools your dryers, slashers, service heaters and other steam heated equipment by moistening the heating surfaces and preventing efficient heat transmission.

A Morehead Back-to-Boiler System will stop this waste by constantly draining condensation **as it forms.** It will give you dry steam lines, coils and spaces and hotter machines. It will increase production and make every pound of fuel produce more.

Write and let us send you reports from other plants where big savings have been effected.

MOREHEAD MANUFACTURING CO.
DEPT. C, DETROIT, MICH.

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Morehead

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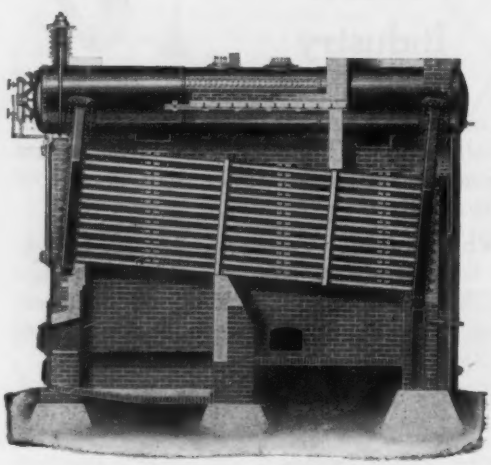
POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

WATER TUBE BOILERS



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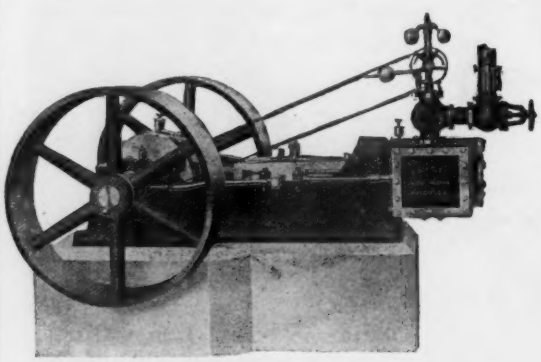

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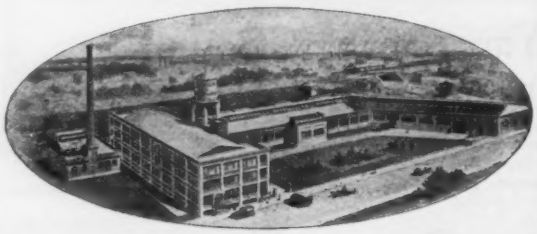

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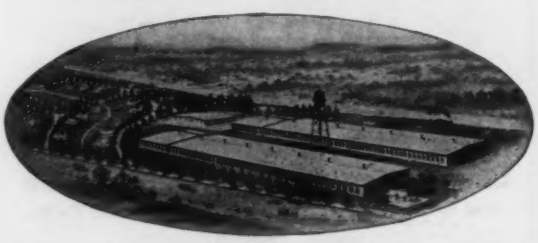

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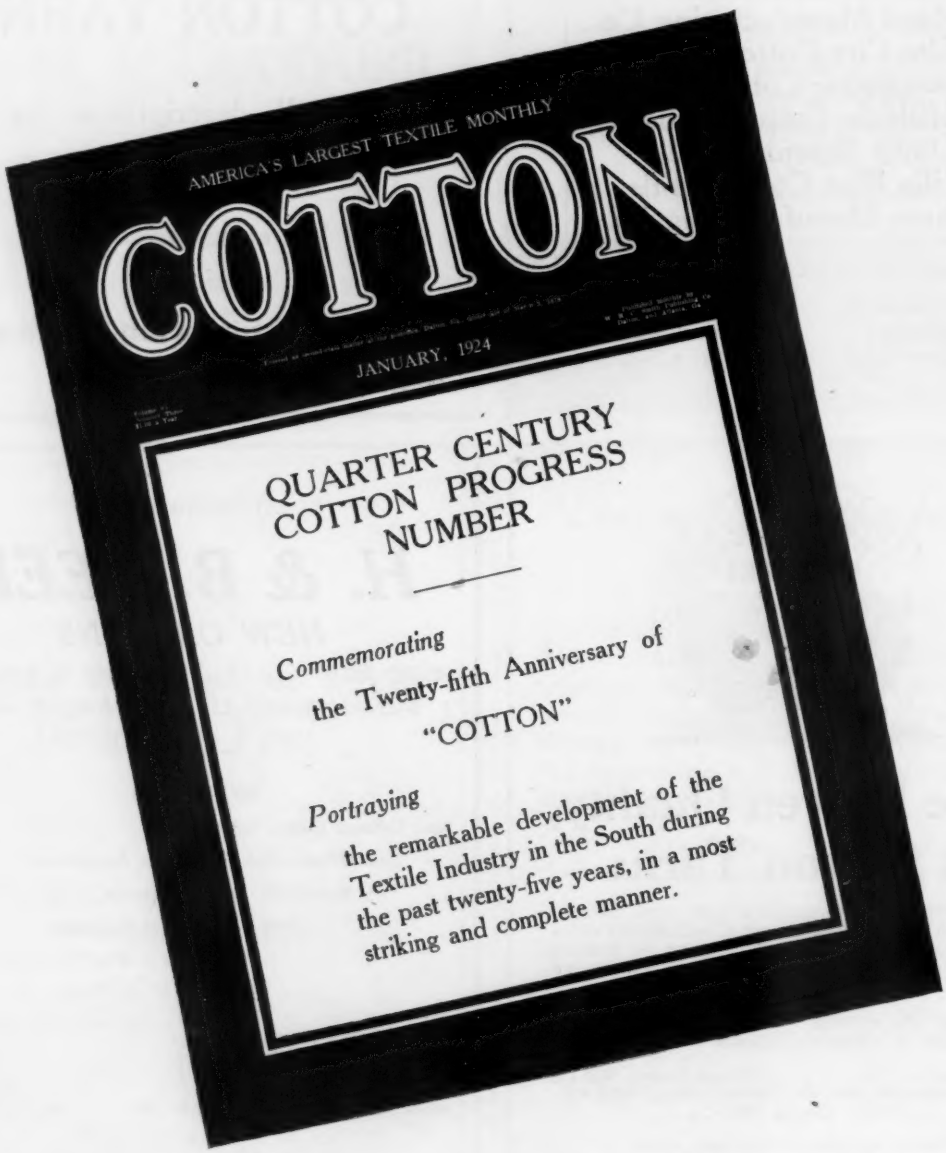

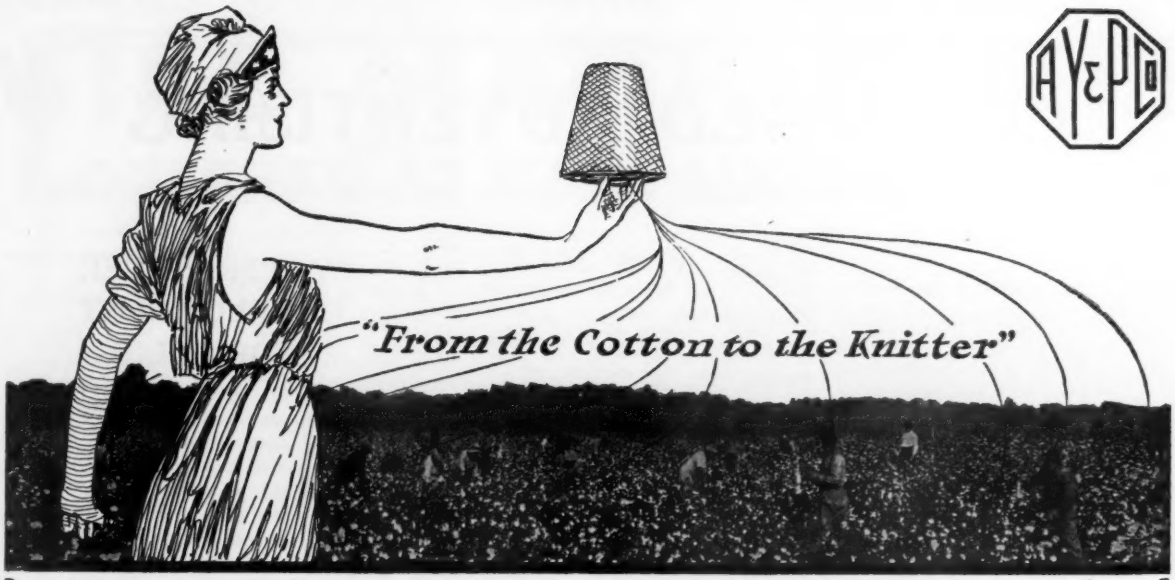

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Howe and Fairbanks Scales. Capacities 600 lbs. to 100 tons. Guaranteed to be in good condition.

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Welded Steel Digesters. Capacity 1300 cu. ft. Inside diameter 8′, length overall 27′. Complete with cast iron supporting ring, hoppers, guides and all accessories.

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Sargent 48″ Special Cotton Washers or Rinsers. Complete with cast iron frame, pans, squeeze rolls, kicker and conveyor.

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Sargent 48″ Model "M" Feeders for Sargent Dryers.

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Noble and Wood Concentrators, right and left hand cylinder washers with octagon cylinder, diameter 44″, length 42″. Rotates at 6 R.P.M. Vat is 4′1½″ wide, 6′9″ long, 2′9″ high.

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42″ American Tool and Machine Co. Centrifugal Wringers. Complete with 42″ perforated steel basket shell, with steel top, basket 22½″ inside depth, ⅜″ steel Wringer direct connected to 40 H.P. Motors.

36″ American Tool and Machine Co. Belt Driven Centrifugal Wringers. Each set arranged in batteries of three.

350 H.P. ENGINES

Corliss Engines. Maker Allis-Chalmers Co. 350 H.P. 18 in. x 36 in. double eccentric, semi-high speed. 125 R.P.M., simple Corliss belted type, designed to operate on 140 lbs. steam pressure with 1½ lbs. back pressure. Double eccentric allows cut off up to 75 per cent of stroke. Flywheel 11 ft. diameter by 32 in. face. Complete with Phoenix individual oiling system. Type R, size 30, made by Richardson-Phoenix Co.

VALVES AND FITTINGS

New and slightly used Crane. Jenkins, Chapman and Walworth Flanged and Screwed Valves, sizes ¼″ to 16″. Fittings of all kinds and classes; screwed up to 3″ and flanged from 3″ to 16″.
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Standard couplings.
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B. & S. post hanger frames.
Ring-oiling bearings.
Capillary-oiling bearings.
Standard-oiling bearings.
Rigid Pillow Blocks.
Standard pillow blocks.
Common flat boxes.
Rigid split vertical bearings.
Split friction clutches.
Solid friction clutches.
Spiral jaw clutches.
Split safety collars.
Solid safety collars.
Lag screws, bolts and nuts.
Steel shafting, 1 7/8 inches up to 5 inches.
Cast iron floor stands.

Write for Specifications and Quotations

OLD HICKORY POWDER PLANT

Old Hickory, Tenn.

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Oxweld Acetylene Co.

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Ernst & Ernst.

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Smith Mfg. Co.

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U. S. Ball Bearing Co.

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Rhoads & Sons, J. E.

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Detroit Belt Lacer Co.
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Lupton's Sons Co., David.

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Buckeye Blower Co.
Carrier Eng. Corp.
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Standard Fibre Co.

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Link-Belt Company.

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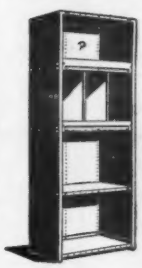

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McCrary Co., J. B.

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Schofield, Wm. Co.
Wagner Mfg. Co.

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Woodward, Baldwin & Co.

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Davis & Furber Mch. Co.
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Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Stafford Co.
Steel Heddle Mfg. Co.
Sturtevant Co., B. F.
Suter, Alfred.
Terrell Machine Co.
Textile Finishing Machinery Co.
Textile Rubber Co.
Toledo Scale Co.
Tolhurst Mch Wks.
U S Bobbin & Shuttle Co.
Washurn & Sons, L. B.
Williams Co., J. H.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

COTTON TAPE LOOM.
Fletcher Works.
Foster Mch. Co.
Schaum & Uhlinger.

COTTON YARN MILLS.
(See Yarn Manufacturers.)

COUNTERS—REVOLUTION, HANK, PICK, ETC.
Bristol Co.
Foxboro Co.
Root Co.

COUNTERS—RESTAURANT.
(See Restaurant Equipment.)

COUPLING—SHAFT.
Cresson-Morris Co.
Dodge Mfg. Co.

COVERING—ROLLER.
Bond Co., Chas.

CRANES.
(See Hoists.)

CRAYONS.
Eclipse Crayon Co.
Lowell Crayon Co.

CREELS.
Auto Creel Corp.
Suter, Alfred.

CREOSOTED FLOORING, BLOCKS, POSTS, SHINGLES, ETC.
Southern Wood Preserving Co.

CULVERTS AND SEWER PIPE.
Carolina Metal Culvert Co.

CUTS FOR PRINTING.
Jacobs & Co.

CUTTERS—CLOTH.
(See Cloth Cutters.)

CUTTERS—THREAD.
(See Thread Cutters.)

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Oxweld Acetylene Co.

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Oxweld Acetylene Co.
Standard Gas Products Co.

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American Moistening Co.
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(See Boxes—Packing.)

DESKS—FACTORY.
Allen Co.
Lupton's Sons Co., David.

DEXTRINES.
(See Dyestuffs and Chemicals.)

DIAL SCALES.
(See Scales.)

DIES—STEEL.
(See Stamps, Stencils, Etc.)

DIE STOCKS.
(See Pipe Threaders.)

DISINFECTANTS.
Barrett Co., The.

DOBBY CHAINS.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

DOBBY CARDS.
Jacobs & Co., E. H.

DOFFING BOXES—MILL.
(See Boxes—Mill.)

DOFFER FILLETS.
(See Fillets.)

DOFFING CANS.
(See Cans.)

DOORS—STEEL.
Dowman, George.
Dowman-Dozier Mfg. Co.
Mills Co.
Lupton's Sons Co., David.
Variety Fire Door Co.

DRAINAGE ENGINEERS.
Carolina Metal Culvert Co.

DRAWINGS AND ARTWORK.
Jacobs & Co.

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Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

DRESSING ROOMS (METAL PARTITIONS).
Mills Co.

DRILLS—ELECTRIC.
(See Electric Machinery.)

DRINKING FOUNTAINS.
(See Fountains—Drinking.)

DROP WIRES.
Draper Corp.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.
Williams Co., J. H.

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Rome Machine & Fdry. Co.

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Buckeye Blower Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
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Pearson, Jos. T.

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American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Sturtevant Co., B. F.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems.)

DUSTING MACHINERY.
Davis & Furber Mch. Co.
Proctor & Schwartz, Inc.
Schofield Co., Wm.

DYERS, BLEACHERS AND FINISHERS.
Aberfoyle Mfg. Co.
American Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.
Franklin Process Co.

DYEING, BLEACHING, FINISHING AND PRINTING MACHINERY AND EQUIPMENT.
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Butterworth & Sons Co., H. W.
Chemical Textile Engineers, Inc.
Cole Mfg. Co., R. D.
Dryer Corp. of America.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hightower Box & Tank Co.
Hunt Machine Co., Rodney.
Klauder-Weldon Dyeing Mch. Co.
Phila. Drying Machinery Co.
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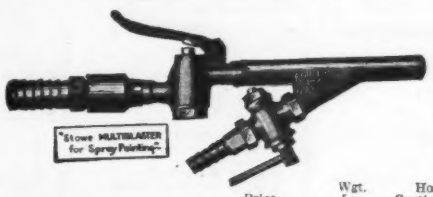

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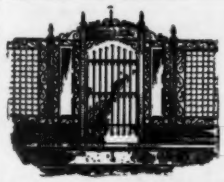

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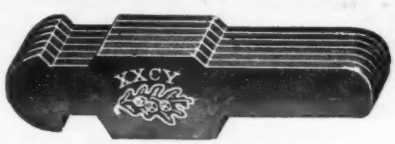

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Quaker City Chemical Co.
Roessler & Hasslacher Chemical Co.
New Brunswick Chemical Co.
Penick & Ford, Ltd.
Rohm & Haas Co.
Sandoz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

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(See Electrical Machinery and Supplies.)

ELECTRIC DYNAMOS AND MOTORS.
(See Motors and Generators.)

ELECTRIC FANS.
(See Fans—Electric.)

ELECTRIC LAMPS.
(See Lamps.)

ELECTRIC LAMP GUARDS.
Perry-Mann Electric Co.
Southern Elec. Supply Co.

ELECTRICAL ENGINEERS AND CONTRACTORS.
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Huntington & Guerry, Inc.
McCrary Co., J. B.
Panton, Harrison D.
Perry-Mann Electric Co.

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(See Illuminating Engineers.)

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Bristol Co.
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Cooper Hewitt Electric Co.
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Cutler Works, George.
Euclid Crane & Hoist Co.
Fulton Supply Co.
General Electric Co.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Elec. Supply Co.
Sturtevant Co., B. F.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

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(See Power.)

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Rex Eng'g Corp.

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(See Tractors and Trucks—Electric.)

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Collins, J. D.
Euclid Crane & Hoist Co.

ELEVATORS.
Link-Belt Company.

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Mitchell Bissell Co.

ENAMEL—MILL WHITE.
(See Paint.)

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(See Architects.)

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Fulton Supply Co.

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Cole Mfg. Co., R. D.
Fulton Supply Co.
Lombard Iron Works & Supply Co.
Schofield's Sons Co., J. S.
Toomey, Frank.

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Casey-Hedges Co.
Crane Co.
Fulton Supply Co.
Jenkins Bros.
Lunkenheimer Co.
Westinghouse Elec. & Mfg. Co.

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McCrary Co., J. B.

ENGINEERS (TEXTILE AND MECHANICAL CONSULTING).
Panton, Harrison D.

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Bird-Potts & Co., Inc.

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(See Blowers.)

EXPORTERS—COTTON.
(See Brokers.)

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Schaum & Uhlinger.
Tolhurst Machine Works.

FACTORY DESKS.
Lupton's Sons Co., David.

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(See Industrial Sites.)

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Buckeye Blower Co.
Carter Electric Co.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

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(See Blowers and Blowing Systems.)

FASTENERS—BELT.
(See Belt Fasteners.)

FEED WATER PURIFIERS.
(See Boiler Feed Water Purification.)

FEEDERS.
(See Automatic Feeders.)

FELTING MACHINERY.
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FENCE—STEEL AND IRON.
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Cyclone Fence Co.
Dowman, George.

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(See Dyers, Bleachers and Finishers.)

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Quaker City Chemical Co.
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Sandoz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

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Dowman-Dozier Mfg. Co.
Dowman, George.
Luptons Sons Co., David.
Sanymetal Products Co.
Truscon Steel Co.
Variety Fire Door Co.

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(See Hose—Fire.)

FIRE PROTECTING PAINT.
(See Paint.)

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(See Brushes.)

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(See Clutches—Friction.)

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FURNITURE—MILL.
Manufacturing Equip. & Eng' Co.
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Sanymetal Products Co.
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Fulton Supply Co.
Perry-Mann Electric Co.
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GAUGES—WATER.
Fulton Supply Co.
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Cresson-Morris Co.

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(See Motors and Generators.)

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(See Lubricants.)

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(See Lubricators.)

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(See Card Grinding Machinery.)

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(See Electric Lamp Guards.)

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(See Finishing and Sizing Materials.)

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(See Counters.)

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(See Size Kettles.)

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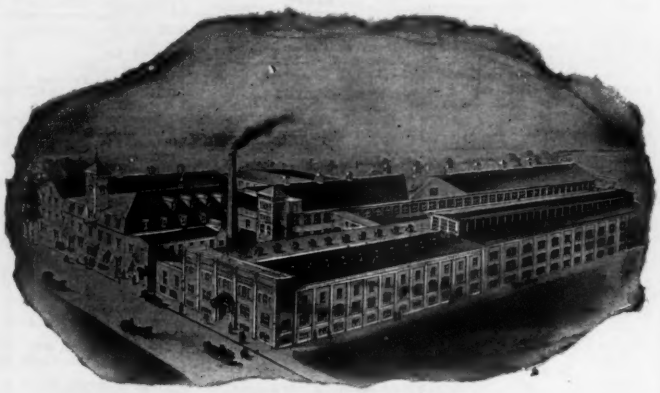

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General Machine Works.
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Hemphill Mfg. Co.
Scott & Williams.
Torrington Co.
Trump Bros. Machine Co.
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Mill Devices Co.

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(See Belt Lacing.)

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Cooper Hewitt Electric Co.
Curtis Co., The.
Cutter Works, George.
General Electric Co.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

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LAMP REFLECTORS.
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Cooper Hewitt Electric Co.
Curtis Co., The.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

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Saco-Lowell Shops.
Whitin Machine Works.

LATHES.
Fulton Supply Co.

LAUNDRY BAGS, BASKETS & NETS.
Smith Mfg. Co.

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American Laundry Mchry. Co.
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Rome Machine & Fdry. Co.
Schaum & Uhlinger.
Tolhurst Machine Works.

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Manufacturing Equip. & Eng'g Co.
Vogel Co., Jos. A.

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Oxweld Acetylene Co.

LEATHER BELTING.
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American Supply Co.
Bond Co., Chas.
Graton & Knight Mfg. Co.
Jacobs Mfg. Co., E. H.
Williams & Sons, I. B.

LIGHTS—FLOOD.
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LINK BELTING.
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LINTERS.
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Link-Belt Company.

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Allen Co.
Dowman, George.
Lupton's Sons Co., David.
Mills Co.
Manufacturing Equip. & Eng'g Co.
Sanymetal Products Co.

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Crompton & Knowles Loom Works.
Draper Corporation.
Fletcher Works.
Hopedale Mfg. Co.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

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Draper Corporation.
Hopedale Mfg. Co.

LOOM HARNESS.
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Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Hayes Loom Reed & Harness Co.
Steel Heddle Mfg. Co.

LOOPS (END).
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LOOP PICKERS.
Jacobs Mfg. Co., E. H.

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Dixon Crucible Co., Jos.
N. Y. & N. J. Lubricant Co.
Texas Co.

LUBRICATORS.
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

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LUG STICKS.
Allen Co.

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Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

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Bird-Potts Co., Inc.
Briggs-Schaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Wks.

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Reutlinger, J. J.

MANIFOLDS.
Oxweld Acetylene Co.

MARKING POTS, STENCILS, INKS, ETC.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

MERCERIZED YARNS.
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MERCERIZERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Boger & Crawford
Dixie Mercerizing Co.

MERCERIZED YARN.
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American Yarn & Pro. Co.
Boger & Crawford Co.
Dixie Mercerizing Co.
Hunter Mfg. & Comm. Co.

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Dowman-Dozier Mfg. Co.
Lupton's Sons Co., David.
Truscon Steel Co.

METAL SIDING.
Dowman, George.
Dowman-Dozier Mfg. Co.

METALS—PERFORATED.
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METAL WORKS (SHEET).
Dowman-Dozier Mfg. Co.

METERS—FLOW, AIR, GAS, ELECTRIC, STEAM, ETC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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MILL BASKETS AND BOXES.
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MILL ENGINEER.
(See Architects and Engineers.)

MILL VILLAGES.
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MILL WHITE PAINT.
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Atlanta Brush Co.

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Carter Electric Co.
Curtis Co., The.
Fulton Supply Co.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

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NAPPER CLOTHING.
Davis & Furber Mch. Co.
Howard Bros. Mch. Co.

NAPPER ROLL GRINDING MACHINES.
(See Card Grinders.)

NAPPING MACHINERY.
Davis & Furber Mch. Co.
Saco-Lowell Shops.

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Granite State Needle Co.
Torrington Co.

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Dixie Seal & Stamp Co.
Jacobs & Co.
Lupton's Sons Co., David.
Monroe Calculating Mch. Co.
Sanymetal Products Co.

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Woodside Securities Co.

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Johnson & Co., Inc., Oliver.
N. Y. & N. J. Lubricant Co.
Texas Co
Wadsworth, Howland & Co., Inc.

OIL ENGINES.
(See Engines Oil.)

OILS—FINISHING.
(See Finishing and Sizing Materials.)

OIL CUPS.
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OIL PAPER.
Bradley Mfg. Co., A. J.

OIL PUMPS.
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Murray Company, The.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

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Chisholm-Moore Mfg. Co.
Curtis Pneumatic Mchry. Co.
Dowman, George.
Euclid Crane & Hoist Co.
Wagner Mfg. Co.

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OXYGEN.
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Williams, C. L.

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DeVilbiss Mfg. Co.
Stowe, Jr., Geo. M.

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Dowman, George.
Dowman-Dozier Mfg. Co.
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Mills Co.
Manufacturers Equip. & Eng'g Co.
Sanymetal Products Co.

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(See Counters.)

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Proctor & Schwartz, Inc.
Schofield Co., Wm.

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Dowman-Do ier Mfg. Co.
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(See Conveyors.)

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Georgia Ry. & Power Co.
Tennessee Electric Power Co.

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Cresson-Morris Co.
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Detroit Belt Lacer Co.
Dixon Crucible Co., Jos.
Dodge Mfg. Co.
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Fulton Supply Co.
General Electric Co.
Graton & Knight Mfg. Co.
Hyatt Roller Bearing Co.
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Morse Chain Co.
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Economy Baler Co.
Logemann Bros. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Rex Eng'g Corp.
Textile Finishing Machinery Co., The.

PRESSURE GAUGES.
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PRESSURE REGULATORS.
(See Regulators—Pressure.)

PRINTERS (CLOTH).
(See Dyers.)

PRINTING.
Jacobs & Co.
Showalter Printing Co., A. J.

PRINTING EXTRACTORS—HYDRO.
Tolhurst Machine Works.

PROPELLER FANS.
(See Blowers.)

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Foxboro Co., Inc., The.

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Link-Belt Company.
Reeves Pulley Co.
Renold, Inc., Hans.

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Reeves Pulley Co.
Williams & Sons, I. B.

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American Oil Pump & Tank Co.
Fulton Supply Co.
Goulds Mfg. Co.
Sydnor Pump & Well Co., Inc.
Toomey, Frank.
Vogt Bros. Mfg. Co.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

PUMPS—OIL.
American Oil Pump & Tank Co.
Lunkenheimer Co.
Vogt Bros. Mfg. Co.

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(See Valve Discs.)

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Foxboro Co.
Taylor Instrument Co.

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Jordan Mfg. Co.
U S Bobbin & Shuttle Co.

QUILL CLEANING MACHINES.
Terrell Machine Co.

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Ryerson & Son, Inc., Jos. T.

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Southern Ry.

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Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

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Howard Bros. Mfg. Co.

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Emmons Loom Harness Co.
Hayes Loom Reed & Harness Co.
Steel Heddle Mfg. Co.

REELS.
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Crompton & Knowles Loom Works.
Draper Corporation.
Hunt Machine Co., Rodney.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

REFLECTORS—LAMPS.
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REGULATORS—LIQUID LEVEL.
Foxboro Co., Inc.
General Electric Co.

REGULATORS (COMPRESSED GAS).
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Briggs Shaffner Co.
Curtis Co., The.
Southern Electrical Supply Co.
Huntington & Guerry, Inc.
Westinghouse Elec. & Mfg. Co.

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Briggs-Shaffner Co.
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Southern Spindle & Flyer Co.

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Sanymetal Products Co.

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General Machine Works.
Wildman Mfg. Co.

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Whitinsville Spinning Ring Co.
Whitin Machine Works.

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RODS (WELDING).
Oxweld Acetylene Co.

ROLLER BEARINGS.
Hyatt Roller Bearing Co.

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Bond & Co., Chas.

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Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS—RUBBER COVERED.
Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
Stowe & Woodward Co.

ROLLS—STEEL.
Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS (WOODEN).
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROOFING.
Barrett Co.
Cortright Metal Roofing Co.
Dowman, George.
Dowman-Dozier Mfg. Co.
Murphy's Sons, C. P.
Richardson Co.
Southern Wood Preserving Co.
Wadsworth, Howland & Co.

ROOFERS.
Dowman, Geo.
Dowman Dozier Mfg. Co.
Murphy's Sons, C. P.

ROOFS WATERPROOFED AND INSULATED.
Murphy's Sons, C. P.

ROOFING AUXILIARIES (PIPE GUTTERS—EAVE TROUGH—ETC.)
Dowman, George.
Dowman-Dozier Mfg. Co.

ROOF AND CEMENT COATING.
American Cement Paint Co.
Barrett & Co.
Detroit Graphite Co.
Hockaday Co.
Johnson & Co., Inc., Oliver.
Murphy's Sons, C. P.
Sonneborn Sons, Inc., L.
Wadsworth, Howland & Co.
Ware Paint Co.

ROPE—TRANSMISSION.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Link-Belt Company.

ROVING CANS.
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ROVING MACHINERY.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

RUBBER COVERED ROLLS.
Stowe & Woodward Co.

RUBBER SPECIALTIES (TEXTILE MILLS).
Textile Rubber Co.
Stowe & Woodward Co.

RUBBER STAMPS.
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SAND BLAST DEVICE.

SASH OPERATOR (WINDOW).
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Dowman, George.

SANITARY PRODUCTS.
Crane Co.
Davis Septic Tank & Eng. Co.
Manufacturing Equip. & Eng'g Co.
Rundle-Spence Mfg. Co.
Sanymetal Products Co.
Vogel Co., Jos. A.

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Toledo Scale Co.

SCALE PREVENTER—BOILER.
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SCREENS—MOVING PICTURE.
Southern Theatre Equip. Co.

SCREENS AND SIEVES—PERFORATED.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link Belt Company.

SCOURING MACHINERY.
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SCRUBBING MACHINE—FLOOR.
American Scrubbing Equip. Co.

SCRUBBING AND WASHING POWDERS.
Mathieson Alkali Works.
India Alkali Works.
Warren Soap Mfg. Co.

SCUTCHERS.
Whitin Mch. Wks.

SECOND HAND MACHINERY AND SUPPLIES.
Old Hickory Powder Plant.
Toomey, Frank, Inc.

SECTION BEAMS.
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SELVAGE HARNESS.
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SEWING MACHINES.
Morrow Machine Co., The.
Textile Finishing Mchy. Co.

SHADES—ELECTRIC LAMP.
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SHAFTING AND HANGERS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Dodge Mfg. Co.
Fafnir Bearing Co.
Fulton Supply Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Skayef Ball Bearing Co.

SHEET STEEL (PLAIN AND GALVANIZED).
Ryerson & Son, Inc., Jos. T.

SHELVING—SECTIONAL STEEL.
Dowman, George.
Dowman-Dozier Mfg. Co.
Hyatt Roller Bearing Co.
Lupton's Sons Co., David.
Manufacturing Equip. & Eng'g Co.
Mills Co.
Sanymetal Products Co.

SHINGLES—ASPHALT.
Barrett Co.
Dowman, George.
Dowman-Dozier Mfg. Co.

SHINGLES (METAL).
Cortright Metal Roofing Co.
Dowman, Geo.
Dowman-Dozier Mfg. Co.

SHINGLES—WOOD.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co

SHIPPING ROOM MACHINERY AND SUPPLIES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.
Hightower Box & Tank Co.
Smith Mfg. Co.
Standard Fibre Co.
Toledo Scale Co.

SHOWER BATHS AND CABINETS.
Crane Co.
Mills Co.
Sanymetal Products Co.

SHUTTLES.
Crompton & Knowles Loom Works.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
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Butterworth & Sons Co., H. W.
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SIZE BOX TEMPERATURE CONTROLLER.
Bristol Co.
Foxboro Co., Inc., The.

SIZE KETTLES AND TANKS.
(See Bleaching Kiers or Tanks.)

SIZING AND FINISHING COMPOUNDS.
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SKEWERS.
Jordan Mfg. Co.

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Dowman, George.
Dowman-Dozier Mfg. Co.
Lupton's Sons Co., David.

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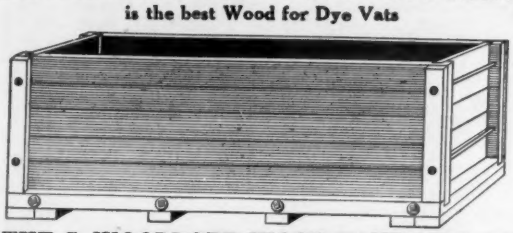

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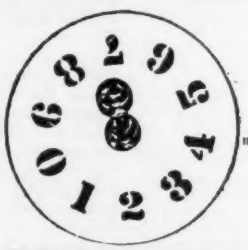

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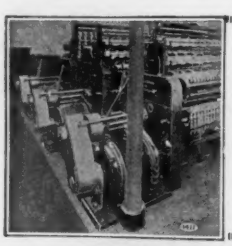

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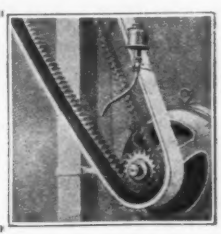

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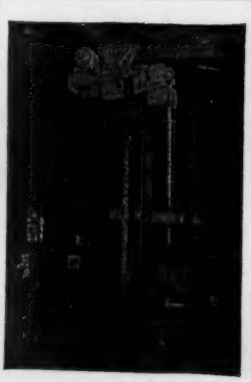

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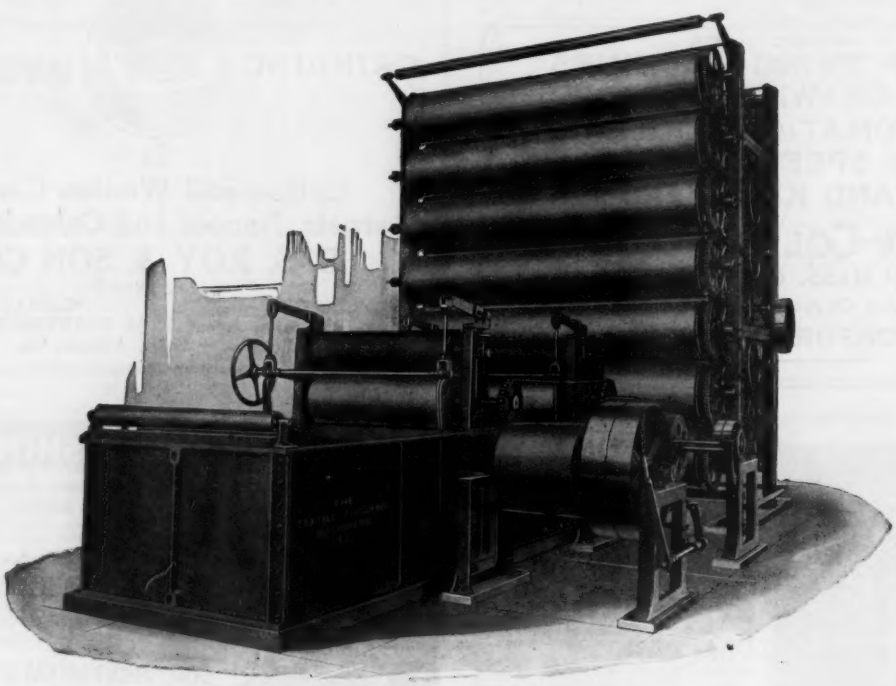

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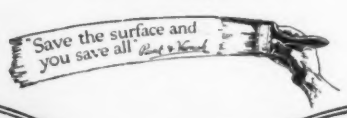

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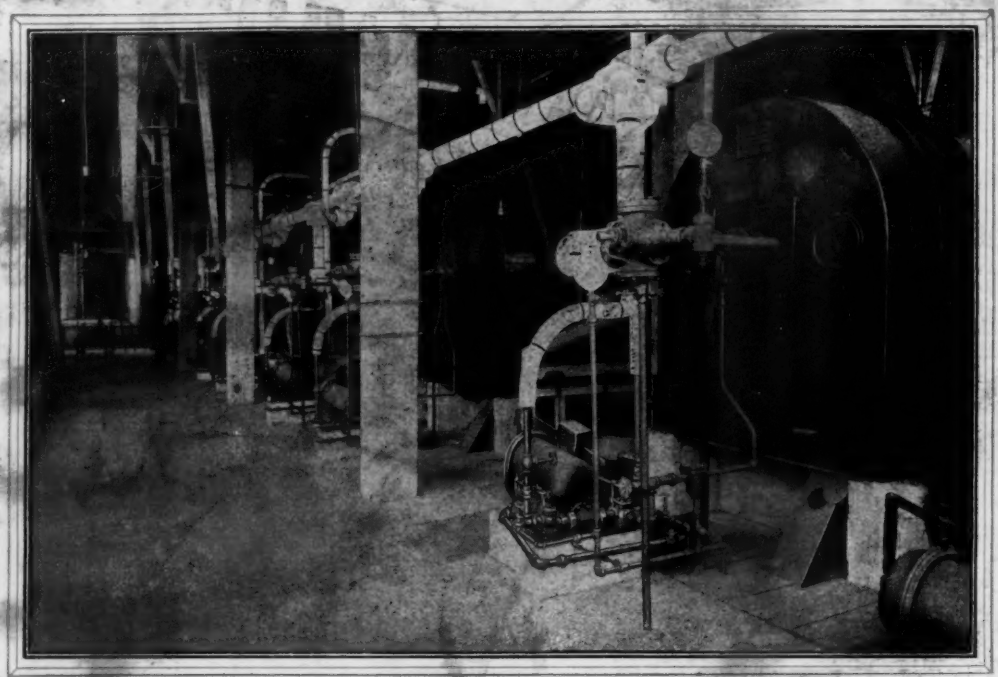

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